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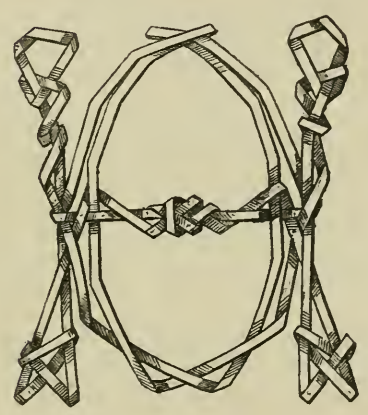

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Part I.

## Original Contributions.

### OPHTHALMIC MISCELLANIES.

By Wm. Bowman, F.R.S.

No. 1.—*Cases of Malformed, Misplaced, and Dislocated Lenses, in some of which Glaucomatous Symptoms were developed.*

[*Abbreviations used in this paper.*—J = Jaeger's text types. OS = Ophthalmoscope. od = optic disc. F = visual field. T = intraocular tension, as follows: Tn = tension normal. T1 ? doubtful increase of tension. T1 = slight but positive increase. T2 = a higher degree, but the globe still impressible by the fingers. T3 = the eye not impressible, stony hard. − T1 ? = doubtful decrease of tension. − T1 = slight but positive decrease of tension. − T2 = another degree of slackness. − T3 = the globe so soft as to allow the fingers to sink in it. These two last degrees are indefinite. (See "British Medical Journal, October 11th, 1862.) ′ = English foot, ″ = English inch. Hm = manifest hypermetropia (see Donders, on "Anomalies of Accommodation and Refraction of the Eye"), where many other useful abbreviations or signs are given). With the better definition of scientific ideas, such abbreviations become more precise in their meaning, while the constantly augmenting volume of scientific literature makes them more and more necessary. It might be well if the ophthalmologists of all countries, to be represented at the Vienna congress next year, would take steps for some common understanding on this subject.]

The following case is interesting in two respects:—First, as an example of a somewhat rare malposition and

defect of the lens, originating during the developemental period, and illustrating the serious risks to which such imperfect eyes are liable; secondly, in its bearing on the explanation of those morbid variations of intraocular tension, whether by excess or deficiency, which at present form one of the most important subjects of ophthalmological inquiry.

Case I.—The patient was a well-built cabman, æt. 22, who had always been considered "short-sighted." With the right eye at 4″ he could read J1, provided he held the head downward and a little to the right side; with the left eye only J6, and that with the head erect. Both eyes were of good size and appearance; the anterior chambers were of ordinary depth; but the irides trembled when the eyes moved, especially in certain positions of the head; and it was noticeable that when the face was inclined downwards the iris advanced, especially the right, and the nasal side of it more than the temporal. The pupils acted promptly and freely, and when they were expanded the lenses could be seen by the OS to be rather small, and placed too high, as well as somewhat inwards, so that their lower margins crossed the pupil obliquely. The fundus of the eye was clearly seen through the lens in the higher part of the pupil, while through the lower part of the pupil it was seen as in cases of aphakia. Very faint marginal opacities existed in both lenses, only discoverable on close inspection. The man had never experienced any trouble with his eyes till the winter of 1863-4, when he was 22 years of age, and when the following circumstances occurred in connection with the *right* eye, the left remaining quiet.

On three occasions, at intervals of about a week, he awoke with the eye dim and misty, soon accompanied by pain in the eye or brow, but towards the middle of the day the symptoms remitted, and he saw as before, forgetting the occurrence till again reminded of it the following week. He came to Moorfields on the third of these occasions, when, *at* 11 *a.m.*, the tension of the eye was found augmented, T1, there was hardly any anterior chamber, the iris was not tremulous, being almost in contact with the cornea, especially at the inner side, where it was evidently bulged forward by the lens. The pupil was dilated, irregularly oval, and inactive; the conjunctival and sclerotic vessels were

congested, with considerable pain and aching of the globe. The visual field, F, was complete, but vision everywhere dull. Fingers could be counted at 1′. The eye was kept under observation. *At* 11.30 *a.m.* the anterior chamber was found less shallow, the iris not so advanced, the pupil circular and more active, and the pain nearly gone. Tension still T1. *At* 12 *o'clock* the anterior chamber was restored to its natural size, the iris tremulous like the opposite one, the pupil active, the mistiness less, no pain, and T1?

I ordered the man to come daily to my house that I might more accurately study these remarkable phenomena. The next day, February 3, he came at 11 a.m. There had been no return of dimness. The right eye was Tn; he could see J1 at 4″; the lens and iris were in their usual state, as described in the opening statement.

I now directed him to alter his posture, to see whether the lens would vary its position, as he thought the pain and dimness had first come on after stooping. He was made to sit with his head held down in a stooping posture from 11·10 till 11·35, but no inconvenience ensued. When he leaned forward the pupil only became dilated, and when he leaned back, so that the eye looked upwards towards the light, the pupil contracted. Next the head was held downwards and to the right side for 10 minutes, and again downwards and towards the left side, but with no perceptible result.

He was now told to return immediately whenever the symptoms might recur, and he presented himself on the 7th, *at* 11 *a.m.*, saying that the eye had been dim and painful as before since he awoke. He could only see J14, and count fingers at $3\frac{1}{2}$′, T1. The pupil was oval and dilated, the anterior chamber very shallow and unequal, the globe acted, and the conjunctival and sclerotic vessels were injected. By the O S the lens was beautifully seen dislocated forwards obliquely half through the pupil, the outer and lower margin being in front of the iris; there also seemed a general slight haze of the surface of the lens, with fine marginal striæ, not previously so apparent. The red reflex of the fundus was distinct on the inner side, but the od was not distinguishable. This condition gradually passed off as before, without treatment.

On the 9th the same kind of attack recurred, but he did not return to me till the day following, *the* 10*th*. He then stated that

the pain and dimness, instead of clearing off towards noon, had continued all day, getting worse towards evening, and having been severe all night. When he came *at* 11 *o'clock* on the 10th, the pain was great, with much congestion and watering, a very shallow anterior chamber, the pupil oval and dilated, the iris not tremulous, and slightly discoloured. He could count fingers at 2′. No iridization. I expected to find the tension increased, but it was normal, Tn. At 12.15, the pain continuing, a solution of atropia of 1 grain to the oz. was dropped in several times, at intervals of 5 minutes, and seemed to relieve the pain, though it had no effect on the size of the pupil. To take 1 gr. of opium at bed-time, or earlier if pain returns.

11th. Slept well. No pain since yesterday, but the eye much injected, and the iris discoloured. Though the anterior chamber is again of good size, the pupil remains ovally dilated, now probably from the atropia, since it is tremulous, and apparently not displaced by the lens, which has fallen back to its original place, though tilted. Vision very misty. He only counts fingers. The cornea is a little hazy, the vitreous also a little turbid, and the fundus not visible. The tension of the eye was now found not augmented, not even of normal amount, but diminished, — T1.

12th. Still no pain, but the cornea more hazy, with more vascularity of the globe, and he cannot even count fingers. The tension still less —T2. The iris was fairly visible, tremulous, nearly in its natural plane, the pupil smaller and nearly circular (the atropia having been omitted), and the lens not advanced. The fundus of the eye could not be seen, owing to the general cloudiness, chiefly of the vitreous.

It was now necessary to devise some treatment for our patient, or to abandon the eye to its fate. After dislocation of the lens forwards, the globe had become glaucomatous for a time; the heightened tension had then given place to a morbid slackness, and though the lens no longer pressed upon the iris, the congestion was increasing, and the vision nearly gone. If the symptoms could be supposed likely to yield to any general treatment, the eye would still be liable to a recurrence of them all on the next dislocation of the lens; but I could not say I thought it possible to escape the entire loss of the eye by anything but operation. I therefore determined at all events to remove the original cause

of the mischief by extracting the lens, and in doing this to excise a portion of the iris, without indeed having any very definite idea of what the immediate effect of this operation might be on the intraocular circulation and tension, though I could not but watch the effect in these respects with much interest. Chloroform was immediately given, and the iridectomy made outwards because it was in that direction that the lens had projected through the pupil. On completing the section of the corneal margin a bead of vitreous protruded in such a manner as to show that it was still contained within the hyaloid capsule. After the iridectomy the lens was removed without difficulty by a small scoop, a bead of vitreous, remaining in the wound, being snipped off with scissors.

The lens was found to be altogether *too small and too convex*, very like the lens of a young child. Its equator was not circular, but irregular, in a way to give an indication of the trilinear arrangement of the segments, *i.e.*, it approached in a slight degree to a triangular outline, when seen from the front or back. No suspensory ligament was discoverable, so that it seemed that what remnant of this structure had previously held the lens in its position had been broken through, during the operation, at the capsule of the lens, not at the ciliary body. The capsule was entire and quite transparent, and the body of the lens almost, if not quite, transparent also.

During the 13th, 14th, and 15th there was no pain, and the eye seemed to be recovering, becoming gradually less vascular, and the vision better. The tension remained — T3 or 2. The further progress was steadily towards recovery, and may be most simply stated by a transcript of the notes, as follows :—

16th. — T1. Sclerotic injection chiefly about the wound; cornea much clearer. Sight improving; can distinguish faces. 24th. — T1. Slight injection at the wound; cornea quite transparent; good anterior chamber. Diffuse haze of the vitreous. Fundus not seen. With $\frac{1}{2\frac{1}{2}}$ reads J13. 27th. — T1? Vitreous hazy still; reflex better, but od not seen. March 5th. — T1? Vitreous still hazy, and flocculi visible by the OS; the od indistinctly seen. With $\frac{1}{2}$ reads J8. 12th. Tn. The vitreous is clearer, and shreds are seen on it, moving with the movements of the eye. 19th. Tn. With $\frac{1}{2}$ reads J3. 26th. Tn. Slight films still seen in the vitreous; od plainly seen, its colour rather

resembling that of the neighbouring fundus; arteries small. With $\frac{1}{3}$ reads J20 at 15′, and with $\frac{1}{2}$ J1. April 9th. Tn. No morbid vascularity, except just at the cicatrix. The eye is "quite comfortable," and (with the lens) "the best of the two." With $\frac{1}{2}$ reads J1.

In connection with the above case, so far as its interest lies in the glaucomatous state induced by the dislocation of the lens, the two following of traumatic dislocation with glaucoma, may be here related.

Case II.—A clergyman, æt. 37, who had Hm $\frac{1}{12}$ in each eye, and who had formerly been successfully operated on for internal strabismus, chanced to have the right eye hit by a morsel of wood, which was being chopped. After the immediate pain of the blow had subsided by simple treatment, he seemed to be recovering, and did not apply for aid until the 4th March, 1864, three weeks after the accident. Great pain had suddenly come on four days before, and had lasted ten hours. The tension of the eye was augmented, = T1. F complete. Could only see J18. The cornea and vitreous were rather hazy, but the OS gave a fair reflex, and though the od was not visible, there was no manifest hæmorrhage. The pupil was much dilated, and the lens, though quite behind the iris, was seen to have dropped somewhat downwards and inwards, so that its upper and outer edge crossed the pupil above, leaving an interval through which a portion of the vitreous humour appeared to project into the interior chamber. The capsule of the lens was unruptured, and the lens was transparent, but as the light fell in different directions from the OS, dark striæ (which I call *striæ of refraction*, as distinct from *striæ of opacity*) were seen, indicating some derangement of the marginal fibrous laminæ. Such striæ I have very often seen, and I suppose they must have been seen by others, as a condition that long precedes, in certain cases, the opaque or cataractous degeneration of the lens. Here they were probably due to the mechanical injury.

Under strict rest and antiphlogistic measures, with the use of atropine, some improvement occurred, and on the 10th he could see J14, and with $\frac{1}{12}$, letters of J6. But the tension continued T1.

17th. T1. Ciliary vessels injected; front of sclerotic, red. Eye weak, watering, and intolerant of light. With $\frac{1}{12}$, J8.

21st. T2. With $\frac{1}{12}$, J10. Cornea and fundus, duller; lens more advanced, pushing the iris slopingly forward, so as to render the anterior chamber shallow. The eye was more painful. He had also now, for the first time, iridizations; a candle was surrounded by an orange, yellow, and blue halo, the colours not being bright.

I now determined, as in the preceding case, to attempt relief by operation. Under chloroform, a marginal incision of two lines was made upwards and outwards by a Sichel's knife, and a bead of vitreous, which at once protruded, apparently in the hyaloid tunic, was snipped off. A spoon was now passed behind the lens and its capsule, and the lens, rupturing in the attempt, was withdrawn in two or three portions; but as it was transparent, some fragments were probably left. More rather solid, clear vitreous protruding, in all about five or six minims, was now snipped off by scissors, and the eye closed. No iris was removed, as the instruments failed to take hold of it; the vitreous folding it backwards above and behind the corneal section, as usual in such cases. It will be seen that it would have been better if it could have been excised at the time. After operation, —T2.

22nd. No pain; but some swelling of the lids, Tn. Two leeches were applied.

23rd. More pain; the swelling of the lids extends to the temple, and the leech bites are suppurating. Some chemosis. Goulard lotion.

After this the tumefaction subsided gradually. The tension of the eye was then found normal. On the 26th he could see the hand, but could not count fingers. The next day he could count fingers held close; the following day at 4′. On the 30th, with $\frac{1}{2\frac{1}{2}}$, J15. The centre of the section gaping, and the iris protruding there, was snipped off on the 31st. On April 11th, the eye continued red, but pain had quite ceased. On May 10th, redness nearly gone, but returned on use. Tn, with $\frac{1}{2\frac{1}{2}}$, J8. After this the eye became strong, and the vision still improved when he was last heard of in January, 1865.

Case III.—A little boy, $8\frac{1}{2}$ years old, in the middle of May, 1863, had the right eye hit by a child's blunt arrow. The lens was thrown upwards and outwards in the direction of the ciliary body, the lower and inner half of it remaining visible; very little

inflammation followed, and the pupil being kept dilated with belladonna, the eye seemed to be suffering little from the injury, except the impairment of its sight. I did not see him until the 11th of July. The lens was then in the position indicated, its lower and inner margin crossing the pupil obliquely near its centre, and the pupil below this being hazy, and having a dull reflex by the OS. The pupil was also drawn downwards and inwards (*i.e.*, in the direction contrary to that which the lens had taken), probably from vitreous humour which had been forced forwards through it on that side at the moment of injury. The anterior chamber was rather large; the cornea, slightly hazy; the ciliary vessels somewhat injected. The eye was decidedly too hard, T2. As there was little pain, it was doubtful how long the glaucomatous state had existed. Iridectomy, however, and the extraction of the displaced lens being clearly indicated, both were at once proposed, and performed the same day. The iris was excised over the lens, upwards and outwards, and the greater part of the lens easily removed by a scoop. Some vitreous humour was necessarily lost, which was firm and apparently clear.

After this, there was — T for three days, and afterwards Tn until the 25th, when it rose to T1, with a little renewed redness; the sight again less clear than it had become subsequent to the operation. There was no obvious cause for this new increase of tension, and it was treated by rest, atropine lotion, and seclusion of the eye from light.

27th. Still T1, but less redness, and eye quieter.

Aug. 6th. Tn; no redness or pain.

*Remarks on the three foregoing Cases.*

In the first, the sudden displacement of the lens and pressure on the iris, so as to force it forwards, and drag upon its ciliary attachment, dilating the pupil, seemed to give rise to the glaucomatous state,—to a redundance of the secretions within the eye, and a heightened tension in consequence. This subsided and recurred several times, in apparent dependence on the same cause. Finally, under a continuance of this displacement, and of the congestion

and consequent effusions, the glaucomatous tension gave place spontaneously to the reverse state, viz., a morbid slackness, which is not usual in idiopathic glaucoma, but which must be regarded as a phenomenon of the same order as the hardness, only in the reverse direction—a disturbance of the balance of secretion and absorption from certain vessels within the eye. If the one condition, according to the views of Professor Donders, be the result of a reflex irritation of the nerves controlling the secretions, the morbid softness may have been a consequence of this irritation having passed over into a state of paralysis of the same nerves. Whatever the explanation, the fact is remarkable, not less than the additional fact that iridectomy, with the removal of the lens as the original exciting cause of the whole, put an end to the whole series of morbid phenomena, and restored permanently the healthy state of the vessels, and the proper balance of the tension.

In the second case also (that of the clergyman) the glaucomatous hardness of the eye seemed to originate in the traumatic displacement of the lens and pressure on the iris. It increased as the iris was more pushed forwards towards the cornea; and it was similarly at once relieved by the operation, though the removal of the lens only, with some vitreous humour, sufficed for the result.

In Case 3, the conditions produced by the injury, as well as the remedy, were of corresponding kind.

In neither of these cases of glaucomatous disease, produced by a mechanical cause, was there any tendency to suppuration of the globe, or even to hypopyon, *i.e.*, effusion of pus or lymph into the anterior chamber. In this they correspond with ordinary glaucomatous affections, where effusions are usually serous, rather than fibrinous or purulent. And this has, no doubt, a close and intimate relation with the nature of the morbid process. In iritis, attended by effusion of serum or lymph, and in ordinary hypopyon, augmented tension of the globe is, as a rule, absent. Thus the *type* of glaucomatous disease is different

from that of inflammation. It is essentially an altered balance of secretion, in which intra-ocular secretion, even if of only the natural fluids of the eye, is in excess of the normal quantity, and removal by the vessels does not keep pace with the effusions from them. When pus or lymph are poured out into the chambers or tissues of the eye, as a consequence of inflammation, not of the glaucomatous type, the normal fluids, especially the water of the aqueous or vitreous humours, are absorbed in a corresponding or even an excessive measure, and the tension of the whole organ remains normal, or may be even slackened. Those who would advance at all towards an understanding of the nature of glaucomatous disease, must acknowledge these facts, for they are fundamental. It seems to be a reasonable corollary from them, that glaucoma is, in its essence, not an inflammation; and when inflammatory, only so, as it were, by accident or complication. It is easy to see how serious such an inflammatory complication must become when affecting the vessels of structures confined by their very anatomical arrangement within the corneo-sclerotic case, the limits of whose normal extensibility have been already reached under the distending influence of excessive production of secreted contents, and which must then necessarily re-act on the contained tissues with a baneful pressure proportioned to its suddenness and intensity. The acute and penetrating genius of Von Graefe has sufficiently shown how this pressure must be most peculiarly exerted on the optic disc, and on the circulation and innervation of the retina.

Leaving the subject of glaucoma, I may add to the details of the first related case, notices of a few others in which a similar defect of the lenses was observed, as they may go to furnish materials for a general account of such faults of development.

Case IV.—Aug. 17th, 1858. A little boy of 5 years old, had always been noticed to be "short-sighted," but two days ago a peculiar appearance was noticed in the left eye, and he was

brought to me accordingly. His parents stated that eighteen months ago he had fallen out of bed on his head, that he had been stunned for five minutes, and been convulsed; moreover, that a year ago, he had run his head against a door. These facts had been recollected when attention had been now called to the eye, but I could not suppose them material. I found that both lenses were lower than natural, so that when the pupils were moderately dilated, their upper edge crossed a little below the upper margin of the pupil, the right being the lower. "The pupils act well; and whenever the head is held forwards, the left lens falls partially forwards through the pupil and keeps it distended. Even when the head is not in this position both irides are bulged below by the lenses, and they are very tremulous. There is no pain or inflammation."

I took accurate notes of the above condition, and saw the little fellow from time to time. There was occasionally some injection and watering of the eye; and as the extreme mobility of the loose lenses continued, I was apprehensive lest they might not at some time become detached and fall back into the vitreous humour, or at least become dislocated more completely forwards, and occasion serious inflammation, and even loss of the eye, of which I had seen several examples. Accordingly I extracted each lens by a small upper section, under chloroform. They were helped out clear in their capsule, by a spoon which I had had made for the purpose, a little vitreous being lost. Recovery was in each case immediate. No iris prolapsed, and none was excised; but afterwards, the pupils, though quite clear, were drawn upwards as though after iridectomy, the irides remaining as tremulous as before.

With so young a subject, and an unusually undeveloped mind, it was not possible to ascertain the amount of vision. For objects and colours, however, it was manifestly good.

In April, 1862, he could see J16 at 2″, and was little helped by glasses. Both Tn. The OS revealed no evidence of disease about the yellow spot, but in the right eye there were doubtful signs of œdema of the retina.

1863. Mind that of a child much younger. Cannot give his attention to anything. Memory bad. Head large. Doubtful whether glasses of $\frac{1}{6}$ help a little. To try such.

1865. Intelligence growing. Sight certainly not worse; sees

objects very fairly, so that a stranger would not at once observe any defect of sight.

In the preceding case the want of cerebral development, and the probable feebleness of the retinæ, are interesting in connection with this failure in the development of the lenses. Congenital cataracts may occur in the same relation.

The following case illustrates how useful such eyes may be, provided the retina be sound and the lenses stationary, not swinging about with the movements of the head or globe.

Case V.—T. S., æt. 18, school teacher. Sight as now from childhood; had severe fits, with contraction of hands and feet up to two years old; health tolerably good since, but was thought to be consumptive when 12 years old. The head and face are unusually formed, with large overhanging brows and broad alæ nasi. No peculiarity of the teeth; joints of the fingers large. He has read a good deal without difficulty, as indeed the nature of the employment which he now follows shows, for he has only applied on account of being "short-sighted," thinking that glasses will relieve him. He has several brothers and sisters, all with good sight.

He holds the book very near the eyes, and reads with one eye, the left having slight external strabismus. The pupils are rather dilated and sluggish, the right the more so. F normal. Tn.

The right eye could see Snellen 200 at 4′; with $\frac{1}{5}$ 200 at 10′, without a glass J16 at $2\frac{1}{2}''$, after atropia J10.

The left eye, Snellen 100 at 10′; with $\frac{1}{5}$, 100 at 20′, without a glass J1 at $2\frac{1}{2}''$. Convex glasses helped but slightly.

With the OS the lenses are seen in about the upper two-thirds of the pupils, being displaced upwards, as well as too small and false in shape. For the lower margin, instead of being of a regular curve, presents several sinuosities, and takes on the whole an horizontal direction, as though the lowest part had sprung upwards, released from its attachment to the ciliary body, while the lateral parts were still held by the suspensory ligament. It is remarkable, however, that although the lower, and of course the marginal, part of the lens is thus irregular, the nucleus seen in quite the upper part of the pupil, is perfectly circular, and therefore unconformable in its outline to the marginal part. Its outline is distinguishable, because it is not, like the margin, quite trans-

parent, but faintly opaque; in fact, cataractous, though probably only in a very thin lamina of its superficies; and through it, as well as through the clearer margin, as also below, where there is no lens, the od is easily distinguishable. In both eyes there is the myopic arc, in the right below, in the left outwards.

*Remarks.*—In this interesting case the lenses were not mobile, being held by the suspensory ligament in rather more than a half of their circumference, and the irides were also not tremulous. Neither was there the risk of dislocation, which attends more extensive separation of the suspensory ligament. From the integrity of shape and perfectly circular outline of the nucleus, compared with the irregular margin of the superficial layers of the lens in the lower part, it may be inferred that the partial separation from the ciliary body took place after the formation of the nucleus, though this was slightly opaque, but before that of the superficial layers, though, as in juvenile cataracts, these were transparent.

The following case, imperfectly noted, was observed in 1855:—

Case VI.—A young gentleman, æt. 15. Very "short-sighted." When he reads, the paper touches his nose. Pupils both active and clear. Irides dark brown, both very loose and floating. Concave glasses diminish objects, and do not enable him to read further off, or to see better at a distance. The pupils do not alter in size when he looks in the same light from a near to a distant object, or *vice versâ*. His sight at a distance is such that he can count fingers at 30 feet.

The eyes are strong for work, and never tire. He never sees false colours or muscæ. He sees alike in strong light and in dusk. The *right* eye has the worst sight, and cannot read ordinary type.

The right eye was examined under atropia. The lens was seen perfectly clear, but rather small, and displaced downwards and outwards, so that its upper edge crossed the dilated pupil obliquely, about one-third from the top. The precise displacement of the left lens was not recorded.

The following cases exhibit a marked family tendency to imperfection of the eyes, of which one example at least is small and displaced lenses, ending in absolute glaucoma.

Case VII.—Mrs. M., between 60 and 70, has been totally blind in one eye 20 years, in the other 15 years, both probably from acute glaucoma, according to the history.

Case VIII.—Mr. M., æt. 43 (son of Case VII.). Has always had imperfect sight. Both lenses have delicately-traced opacities on the front, those of the right being the fainter, those of the left the denser, but with clear interspaces. As his sight was stationary for many years, these opacities have probably existed from an early age. Lately he thinks the sight has been worse. He uses the right eye for reading, and the left for distant objects, using a concave glass of $-\frac{1}{20}$. Lately the eyes redden on use. There is insufficiency of the int. recti on looking at near objects, the left eye then moving outwards. As he managed to pursue his avocations no operation was recommended, though such may become necessary. Being found to read more comfortably with a convex glass of $\frac{1}{30}$ and prisms of 3°, these were ordered, with an eye-douche.

Case IX.—Mrs. C., æt. 38 (daughter of Case VII.). Sight always imperfect, and has used atropia for many years. Without atropia J18; with atropia J7 and 8. Both eyes present good examples of juvenile nuclear cataracts, the superficial layers of the lenses being clear. She has always read with comfort, but applies now because the atropia has lately irritated her. Another form was ordered, with an intimation that an operation for displacing the pupil would be applicable in case of the belladonna still being unmanageable. For three years I have not heard of her, so that I conclude it succeeds.

Case X.—Miss M., æt. 33 (daughter of Case VII.). Absolute glaucoma of both eyes. Both T1. The right has a singular abrupt and prominent ciliary staphyloma upwards and inwards, the size of half a pea. She was "very short-sighted" as a girl, but could see small objects well with the right eye if they were held very near to it. The right gradually failed 12 years ago; the left also gradually six years ago. No perception of light for three years.

The pupils are widely dilated. Both lenses are clear, and are

displaced upwards and inwards so much that only one-fourth of each is visible in the large pupil. The fundus of the eyes lights up well, there is slight glaucomatous cup in each, and the retinal vessels are atrophied. The loss of sight seems to have been due to simple glaucoma of the ordinary kind.

*Remarks on the last four Cases.*—They illustrate a fact I have often noticed, viz., that a family tendency to defect or disease in the complex organs of sight, though often manifesting itself in even the exactest identity of form, yet may do so in other cases with variations, as here: *a.*, displaced but clear lenses; *b.*, rather peculiar form of early cataract; *c.*, the more common form of nuclear juvenile cataract; *d.*, glaucomatous affection;—the latter being the most subtle, and referrible perhaps to some inherited disposition of the vessels or nerves, which may be supposed to be the primary seat of that disease. It may, however, be added that I have noticed a decided tendency to glaucomatous disease in persons who have undergone, *late in life*, an operation for juvenile cataract—the same operation which at an earlier period would have been perfectly well borne, inducing in them an intractable glaucomatous reaction, and constituting one of several valid grounds for not too long delaying operative relief. I have attributed this to the long strain to which such eyes have been exposed in looking always through the dull medium—a strain alike of the retina, of the ciliary apparatus, and of the external muscles, and manifested often by redness, watering, and distress. But yet glaucoma, independently of this, is often decidedly hereditary, or a family complaint.

## CASES OF NEURO-RETINITIS ASSOCIATED WITH KIDNEY DISEASE.

By J. W. Hulke.

*Assistant-Surgeon to the Hospital, and to the Middlesex Hospital.*

The association of impaired sight with kidney disease was recognised as far back as 1839 by Addison, and an article was written upon it by Landouzy, in the *Gazette Médicale de Paris*, ten years later; but our knowledge of the tissue-changes, on which the visual defect depends, and of their objective signs, is of recent date; it belongs to the era of the ophthalmoscope, and has been chiefly worked out by our indefatigable German confrères.

The ocular affection, erroneously regarded by Landouzy as the precursor of the renal, usually first appears when the kidneys have become granular and contracted, and when the left ventricle of the heart is hypertrophied.

The visual defect assumes two forms, the one a rapid diminution of acuity, occurring simultaneously with other disturbances of the cerebro-spinal system; as drowsiness, convulsions, delirium; the other a slowly progressive diminution of acuity, interrupted by occasional accessions of greater dimness, with contraction and mutilation of the visual field, not ending in absolute blindness, and susceptible of improvement.

In connection with the last form, these morbid changes are found in the optic nerve, retina, choroid, and vitreous humour. The optic nerve is swollen by the presence of an excess of extravascular serum, it is œdematous, and by the proliferation of the corpuscles of its interstitial connective tissue. The ophthalmoscopic effects of this are that the outlines of the tumid nerve are hazy or hidden, the normal reflexion from the lamina cribrosa is absent, the central vessels are indistinct and cannot be traced

backwards from the surface of the nerve. Around the nerve is a zone of grey œdematous retina in the inner layers of which very singular bodies occur which have given rise to much discussion.

They bear some resemblance to ganglion cells, and were at first supposed to be such, enlarged and sclerosed. In vertical sections, tangental to the optic nerve-entrance, they are found scattered or clustered in nests, packed in the arcades formed by the inner ends of Müller's connective radial fibres. Where the clusters are large, they slightly project the inner surface of the retina, and encroach upon and displace the layers at their outer surface. They have been observed to reach nearly as far outwards as the layer of Outer granules, and at this stage it would scarcely be possible to say in which layer they originated.

Their ganglionic origin was shortly disproved by the observation, that at an early period, when they are scattered, or when the clusters are still small, they occur in the layer of optic nerve fibres; this led to the conjecture that they were peculiar transformations of these fibres, and the subsequent discovery of their apparent continuity with and passage into the nerve fibres appeared to finally put their source beyond doubt. Besides these nodal thickenings, a uniform swelling of the nerve fibres, attributed to œdema, has been described by some.

Two alterations are observed in the connective tissue elements, hypertrophy with sclerosis, which chiefly affects the stout inner portions of Müller's radial fibres, and the interstitial tissue (the glioma after Virchow's nomenclature) derived from these; and fatty degeneration, which principally affects the fine terminal branches of these fibres in the outer layers.

This disintegration of the connective tissue has been regarded by some as the source of the large granular corpuscles which occur in great numbers, principally in the inter granule and outer granule layers, the opinion resting

chiefly on the visual improvement which occasionally follows the disappearance of the white dots which they form when clustered. These dots run together in a wall around the grey zone encircling the optic nerve, they also stipple this opaque zone, radiate in lines from the fovea, and form small glistening white islands in the transparent retina. The fatty metamorphosis of the glioma may be one source, and, perhaps, the disintegration of extravasated blood is a second, but I think it not improbable that the fatty transformation of the excessive hyper-albuminous and fibrinogenous serum constituting the œdema is the principal source. The structureless and fibrillated coagula which form such conspicuous objects in vertical sections are evidently referable to this exhalation. The structureless coagula also principally occur in the inter-granule layer. They range from the size of a blood disc to large irregular nodules and are often branched. They have a peculiar pellucid aspect, some acquire a very deep tint from carmine, while others remain almost colourless after long immersion in the staining fluid, and sometimes different parts of the same nodule will be differently affected by the dye.

In describing the large granular corpuscles, I referred to extravasated blood discs. These escape from ruptured capillaries. I do not recollect in this class of cases one instance of hæmorrhage from the larger vessels. The capillaries are dilated, and sacculated and attenuated by the increased pressure on their inner surface, which results from the disturbance of the normal attraction between the circulating blood and the tissues arising from the presence of urinary constituents in it, from the compression of the veins in the swollen optic nerve, and from the increased impulsion of the blood-column of the hypertrophied ventricle; or the walls of the capillaries are thickened by an amyloid deposit, and their calibre proportionately narrowed. Amyloid thickening of the arteries has been anatomically verified, and I have found the muscular coat

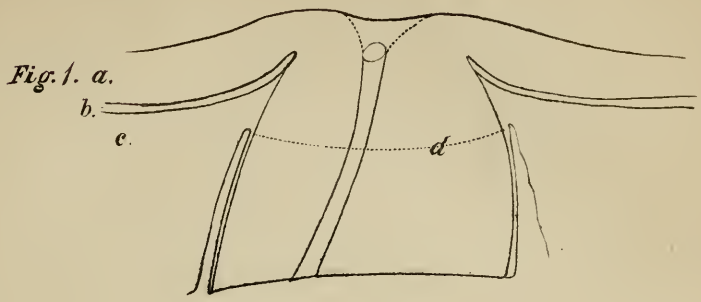


Fig. 1. a.
b.
c.
d

Fig. 4.

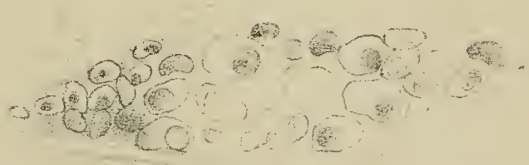


Fig. 3.

Fig. 2.

## EXPLANATION OF PLATE.

(*To face page* 18.)

FIG. 1.—A vertical section of the optic nerve through its centre. *a*. Retina. *b*. Choroid. *c*. Sclerotic. *d*. Posterior limit of the lamina cribrosa.

FIG. 2.—A vertical section of the retina near the optic nerve and radial from it. × 240.

1. Membrana limitans externæ. 2. Outer granule layer. 3. Intergranule layer, containing nodular coagula and large granular corpuscles. 4. Inner granule layer. 5. Granule layer. 6. Ganglionic layer. 7. Optic nerve layer. 8. Membrana limitans interna, with roots of H. Müller's connective radial fibres.

FIG. 3.—A nest of sclerosed nerve-fibres? *in* the optic nerve layer.

1. Normal optic nerve fibres. 2. Sclerosed ditto. 3. Membrana limitans interna. 4. H. Müller's connective radial fibres.

FIG. 4.—Isolated sclerosed nerve-fibres from the above section.

much hypertrophied. The veins are swollen. In the opaque region both the veins and arteries are concealed wherever they dip from the surface, with the appearance of frequent breaks in their continuity. The tissue-changes in the choroid are less known than those in the retina. Amyloid deposits in the chorio-capillaris is one of the most important, since such a condition of the capillary membrane is calculated to hinder osmosis, and to impair the nutrition of the bacillary retinal elements.

The alterations which have been observed in the vitreous humour are a finely granulated haze, proliferation of its corpuscles, and the irruption of blood discs and fibrillated coagula from the ruptured retinal capillaries.

These textural changes in the retina and optic nerve form the "chronic retinitis" of some, the "retinal degeneration of Bright's disease" of other ophthalmic surgeons. While any of their equivalent ophthalmoscopic signs is enough to excite a suspicion of retinal disease, it has been said that in order to possess a pathognomonic value they must be collectively present, and definitely grouped. The swollen nerve should be encircled by an opaque grey retinal zone; this in turn surrounded by a white belt, and the yellow spot marked by radial lines of white dots.

According to my own experience, such a disposition does not occur in the majority of cases. In many cases some signs only are present, and their value in these is lessened by the fact that every one of the textural changes denoted by them has been observed where kidney disease could not be detected, notwithstanding careful and frequent examination, chemical and microscopic, of the urine. Although cases are not unfrequent in our out-patient room I had never been able to procure material for an anatomical investigation until some months ago, when I obtained the eyes of two patients. An account of these, with short notices of some other cases taken from my note-book, may not be uninteresting to our readers.

CASE I.—*Neuro-retinitis—Granular, Contracted Kidney, and Hypertrophy of the Left Ventricle of the Heart.*

February 24, 1864.—A journeyman confectioner, æt. 20, came to the out-patient room complaining of great dimness of sight. He told me that a week before, while at the theatre, his sight became so dim that he could not recognize the actors.

I regret that I have mislaid a note which I made of the state of his vision, but I recollect that its acuity was so diminished that he could not follow his work, which was candying fruit, and he was led into the room.

Both optic nerves were grey and hazy, their outlines were obscured, and within their area the central vessels were indistinct. In the left retina several crimson, brush-like patches of recently extravasated blood radiated from the optic nerve nearly to the equator; and in each eye around the optic nerve there were several small buff spots, which, from their relations to the large venous branches and their shape, I referred to the inner retinal layers. They were, probably, retrograding extravasations. The turgescence of the retinal veins beyond the limit of the optic nerves, where the retina was transparent was very striking.

I found his urine highly albuminous, and learned that for a long time his strength had been declining. He was very thin, pale, and had a troublesome cough.

At his second visit a few days after I found him so weakened by profuse epistaxis that my colleague, Dr. Stewart, took him under his care in the Middlesex Hospital, where he died April 24th of erysipelas.

Dr. Cayley, our demonstrator of morbid anatomy, kindly gave me the following extract from the register:—

"P.M. Reg. No. 1813. Body emaciated. Face very œdematous. Slight general œdema. Lungs œdematous; cretified tubercle in the apex of the right. The pericardium contained ʒiii of cloudy serum. Its serous surface was congested and ecchymosed, and the heart's base was covered with soft yellow lymph. The heart weighed ʒxiv. Its left ventricle was much hypertrophied; the valves were normal. A few small, scattered, atheromatous spots were seen in the ascending aorta. Both kidneys were very small; the right weighed ʒiv, the left ʒiii

only. Their capsules adhered too firmly. Their surfaces were granular, and studded with small cysts. Their texture was tough. The thickness of the cortex varied from 2‴ to 3‴, and its colour was reddish. The gastric mucous membrane was congested, and near the pylorus it was ecchymosed."

The eyes were placed in chromic acid. When hardened I cut the left across at the equator, and carefully removed the vitreous humour from the posterior half. The optic nerve-entrance now appeared unnaturally prominent. In a vertical section laid through the centre the edge of the sclero-choroidal ring was seen to be directed forwards, while the lamina cribrosa was unnaturally concave. Evidently this proceeded from swelling of the intra ocular end of the nerve. The swelling was produced by an abundance of small cells and nuclei, derived from the corpuscles of the glioma. They were imbedded in a granular substance, and formed dark bands between the transparent bundles of nerve fibres. The inner surface of the retina around the nerve glistened, owing to the presence of minute shining dots, clustered in small patches, and streaks which radiated from the nerve in all directions, except at its temporal side, where they formed lines concentric with it across a fold which ran from the fovea towards the nerve. These minute shining dots were strictly confined to the retina. None occurred within the area of the nerve-entrance, their first appearance beginning at the distance of its diameter from it. The glistening region was also marked by a few dull, grey, slightly raised spots, ranging from a fine dot to $\frac{1}{3}$‴; and the retina nearer the equator, which did not glisten, exhibited a few scattered, dark, brown-red extravasations of blood.

The entire venous system of the retina was dilated, even the small peripheral veinlets were conspicuous. The trunks were hidden in the glistening central region wherever they dipped from the surface, and they wholly disappeared from view at the distance of 2‴ from the centre of the nerve owing to the greater turbidity of the tissues here. Vertical sections showed that the retina, particularly around the nerve, was thicker than natural, which in great part proceeded from a loosening and separation of its elementary tissues, such as œdema might have produced. With the exception of the bacillary, the layers were well preserved. The glistening region

contained great numbers of large, compound, granular corpuscles, which were most numerous near the nerve, and became fewer peripherally. They were chiefly restricted to the inter-granule layer, but when very large or in clusters, they encroached upon the inner and outer granule layers.

The inter-granule layer also contained structure nodules, some of which were very large and branched. Most of them were deeply stained by carmine, while others were scarcely tinted by it. They were, probably, albuminous coagula. The muscular coat of the arteries was hypertrophied, and the capillaries were sacculated.

Case II.—*Neuro-retinitis—Contracted, Granular Kidneys—Hypertrophy of Left Side of Heart—Death—Dissection of the Eyes.*

In October, 1864, a pale, feeble woman, æt. 44, came under my care, at the Moorfields Hospital, for ophthalmia tarsi and styes.

After a long absence she was brought December 24, in consequence of failure of her sight a week before. With the right eye, which began to fail a couple of days before the left, she read words in No. 20, and with the left eye No. 16 of Jaeger's types at 6″ distance.

The optic nerve of the right eye was swollen, opaque grey, and surrounded by a zone of greyish, cloudy retina, dappled with dots and brushes of extravasated blood, which radiated from the nerve towards the equator. The central vessels appeared to end at the surface of the nerve, they could not be followed towards the lamina cribrosa, and their larger branches, though swollen, were occasionally hidden in the zone of opaque retina. The ophthalmoscopic signs in the left retina were like those in the right, but less strongly marked. Her urine was albuminous, and she was so gravely ill that I procured her admission into the Middlesex Hospital, under Dr. Stewart, who has kindly supplied me with the following extract from his clinical clerk's book.

———— admitted January 24, 1864. "A woman of fair muscular development and moderate stoutness, complexion dark, a native of Wiltshire, married 25 years, had nine children. Catamenia ceased three years ago. Never had a serious illness

till the present, which began two years ago with weakness and loss of flesh, followed by œdema of the legs. About a month ago had rigors, after which the sight of the right eye became dim, and the next day that of the left eye failed in the same way. After the rigors she kept her bed from a general feeling of illness. Vomiting then began, it sometimes occurred two or three times a day, but was occasionally absent for a day or two. At the date of her admission into the hospital her face was puffy, and her skin coarse and dry; urine very pale, sp. gr. 1010°, depositing a slight cloud of albumen. Pulse 96, soft and very full, occasionally dichrotous. Diastola rather accentuated at the base; systolic bruit at the left edge of the sternum; respiration calm; slight sibilus on the right side."

"The vomiting persisted obstinately. A fortnight after admission the lungs became congested, but this subsided in two or three days. A week afterwards she had copious epistaxis. February 20, she had a fit which lasted about five minutes, both sides of the body were equally convulsed. It was followed by considerable drowsiness and depression. There was no foaming, and the tongue was not bitten. Next day she had a second fit. After this she was drowsy and her mind was confused. Her breathing was almost stertorous. Epistaxis again occurred, other fits followed, then congestion of the lungs, coma, and death, for twelve hours before which there was total suppression of urine."

Dr. Cayley has given me the accompanying note of the post mortem examination made February 22, 1864.

"The heart weighed 13 oz., the wall of the left ventricle was very thick. The edge of one curtain of the mitral valve was thickened. The right pleura contained a few ounces of serum. The kidneys were very small, weighing only $1\frac{3}{4}$ and $2\frac{1}{2}$ oz. Their surface was granular. The medullary substance of the supra-renal capsule contained recently extravasated blood."

The left eye was opened at once. Its optic nerve-entrance and the surrounding retina were swollen and opaque; and some small patches of extravasated blood were grouped about the yellow spot. The right eye was immersed in a solution of chromic acid and afterwards examined with particular reference to the minute textural changes in the retina and nerve. These, with one exception, were identical with those described in the preceding case, the

difference being the sparing occurrence of the bodies, now commonly regarded as hypertrophied nerve fibres. These occurred in small clusters, in very few instances in large nests, in the layer of optic nerve fibres. Many contained one, some two nuclei, which had a homogeneous or coarsely granulated aspect, and took a deep red stain from carmine. The other cell contents, or the material surrounding the nucleus, had a lower refractive power than the nucleus, a finely-granulated texture, and were but lightly tinted by the same carmine solution. I failed to trace any connection between these bodies and the nerve fibres among which they were embedded.

CASE III.—*Neuritis, eventuating in Atrophy—Retinal Hæmorrhages —Disseminated Choroiditis—Waxy and Granular Casts.*

A delicate woman, æt. 38, came to the hospital September 16, 1865. She said that she had been confined with her first child in the preceding July, and that a few weeks before this her sight began to get dim, and her legs swelled. Her strength had not returned since her confinement. She had leucorrhœa, water-brash, and albuminuria, and the urine also contained waxy and granular casts.

With the right eye she could read No. 12, and with the left No. 6 of Jaeger's types, at twelve inches distance.

Both optic nerves were dull-grey. Their outlines were confused. The retinal arteries appeared to be contracted, while the veins were irregularly swollen. Towards the equator the choroid was thickly sprinkled with minute black dots. They were sharply defined, and the details of the surrounding structures were distinctly visible through the transparent retina. I prescribed tinct. ferri. muriatis, apparently with benefit to the renal disease, since she gained flesh and strength, but her visual acuity continued to diminish, so that October 21st the left eye read No. 16, and the right No. 12, Jaeger's types.

December 23rd.—A still further decrease was noted, the left eye reading No. 18, the right No. 16. The turgescence of the retinal veins was less. The black choroidal dots were numerous. Some of them were fringed with a very narrow, whitish ring, in which the disappearance of the choroidal epithelium exposed the

sclerotic to view. In the left eye the black dots had invaded the area of the yellow spot.

May 27, 1864.—A still larger number of the black choroid dots were seen in each eye. The optic nerves were anæmic, and the details of the lamina cribrosa were unnaturally distinct up to the very edge of the nerve which was slightly blueish. In the right eye, upon and below the yellow spot, were four crimson patches of extravasated blood, and a still larger fifth patch below and at the nasal side of the nerve.

February 13th.—Much of the extravasated blood had been removed. The details of the choroid were now dimly perceptible through the largest patch. The visual acuity of the right eye had slightly increased, and that of the left in a very remarkable degree, for this eye now read No. 1 slowly. A fortnight later all traces of the extravasated blood had disappeared. She complained of increasing weakness, and a few days afterwards miscarried of a two months fœtus.

March 17th.—The optic nerves are more anœmic, and the details of the lamina cribrosa are still plainer. There are a few small, scattered extravasations of blood in the right retina.

April 23rd.—The left optic nerve is very white, and the arteries are so contracted that the primary and secondary divisions only are traceable, and this for a short distance. The black dots are still numerous in the choroid near the optic nerve, but have left the equator. They have entirely disappeared from the right retina. The visual acuity of the left eye, which had improved so remarkably that Feb. 13, No. 1 was read, is now diminished, that even No. 20 is not perceived. There is a slight improvement of that of the right eye (No. 12). She says she is stronger than she has been for a long time, and she looks better.

### Case IV.—*Neuritis—Amyloid Thickening of the Arterial System of the Retina—Albuminuria—Apoplexy—Death.*

A painter, æt. 54, happening to close his left eye, was surprised that he did not see with his right. Eight months after this, his left eye becoming dim, he was brought to the hospital, October 18, 1862.

The right eye was still slightly sensitive to light. Its optic

nerve was dull, greyish white; the vertical portions of the central vessels, and the lamina cribrosa were hidden. The retinal arterial tree had a most singular appearance which I had never noticed before. The primary and secondary divisions of the artery in the area of the nerve, and in the retina, resembled stone-white cylinders, marked with an interrupted axial red streak, where the coats were thin enough to allow the blood to be seen.

In some places the red blood streak was very uniform, while in others its breadth was irregular, its edges were pale, and its ends tapered. The lengths of vessel exhibiting the red streak were separated by other lengths entirely white, from which it was wholly absent. In the secondary divisions the red axial streak was proportionately wider than the primary, and occasionally it occupied the whole breadth of the vessel, to the complete interruption of the white border. In the tertiary divisions the interruption of the opaque margin was more frequent, and the finest arterial branches exhibited only a linear series of opaque white dots, between which the vessel seemed to be healthy.

With the left eye he recognized such objects as a finger, but could not spell the largest type. Its optic nerve-entrance was reddish, and opaque. The veins within its limit were hidden, while beyond they were very swollen. The vitreous humour was hazy.

He habitually drank to excess. His complexion was sallow, and his appearance haggard. His urine had a high specific gravity, and was highly albuminous. I saw him once only, and I recently heard from his daughter that he died soon after of apoplexy.

## A NOTE ON "INTERMITTENT GLAUCOMA."

By Ernest Hart,

*Ophthalmic Surgeon in St. Mary's Hospital, London, and Lecturer on Ophthalmic Surgery in the School.*

The following brief details will afford a view of a variety of glaucoma, which, I think, deserves to be distinguished as intermittent glaucoma. The study of cases of this type will probably afford material for a nearer comprehension of the pathology of that disease. They present, at least, an interesting and suggestive phase of the affection.

A lady beyond the middle age, and some years past the critical period, having enjoyed excellent health up to the time of her present attack, applied to me in the summer of 1865 to examine the left eye. She was suffering acute pain in the eyeball. It was deep seated, and extended over the brow. When she saw me she was completely blind with that eye, not having even the capacity of perception of light and darkness. The eyeball was of stony hardness. The pupil was dilated ovally, and immovable; the superficial vessels somewhat, but not greatly, enlarged. She was not much alarmed about it. She told me that her eyes had been perfectly healthy until three weeks previously; that she had then suddenly felt some pain, and slight accessions of dimness of vision, and had consulted an eminent ophthalmic surgeon, whose opinion is justly of great weight, and who had not found at that time any cause for apprehension, but had prescribed a slight general treatment. This had seemed to relieve the uneasiness of the eyeball at the time, but a few days afterwards the right eye became suddenly more dim, then failed altogether, the next day greatly recovered, so that she could read "small print." For the few days before she came to me the pain had been more acute, and the vision had gone. She anticipated, however, a return of sight, probably in a day or two, and was chiefly induced to call on me by the

anxiety of her friends. The ophthalmoscopic signs confirmed entirely the external symptoms, and I felt bound to state to her friends the serious conditions present, and to advise iridectomy. I repeated this recommendation urgently in consultation with Dr. Bradley, of Greenwich, and subsequently in consultation with Mr. Bowman, who supported that recommendation. Professor Donders happening to be in London at this time, Mrs. C. had also the benefit of his opinion, and Professor Donders also strongly urged the same view. A further period of total blindness and acute pain at length reconciled her to accept the proposition, which she held, however, in great horror, and the more so that after a fortnight or more of complete loss of vision it was not possible to make any but a dubious statement of the probable results of iridectomy. The vitreous was now cloudy, and the fundus could not be well illuminated, but there was no loss of polish of the cornea, nor was the superficial congestion much increased. Assisted by Dr. Bradley, Mr. Mahon, of St. Mary's, and Mr. Teevan, of Westminster Hospital, I performed an ample upper iridectomy for her on the 13th July. There were no difficulties in the operation, which was uncomplicated. There was no effusion of blood into the chambers of the eye. The immediate effect of the operation was to relieve all pain. The patient, although of the most highly excitable temperament, and suffering greatly both in mind and body during the two previous days, displayed a remarkable equanimity after the operation. She suffered nothing, she said; and at the end of four days, when I just raised the lid, declared that she could see my features indistinctly. Five weeks afterwards she could read clear print (No. IV, Giraud-Teulon) with ease.

The second case which I will mention is one of a very puzzling character, and in which there were singular complications. The patient was an unmarried lady, under the care of Mr. Noverre, of South Street, Park Lane. She was of highly nervous temperament, and had been subject to a

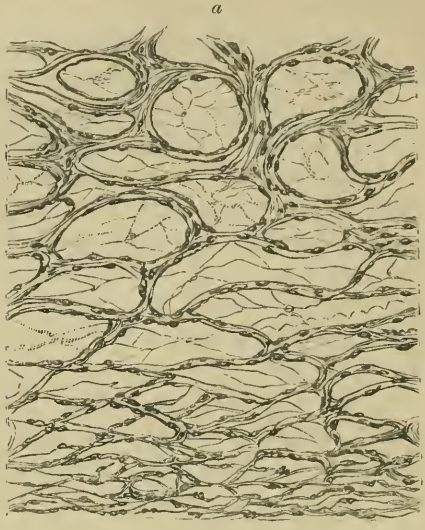
variety of hysterical affections in succession. I was called to her in October, 1864, and learnt the following particulars: She had been suffering during July and August from dubious head symptoms, which were either wholly or in part hysterical. In September she was seriously ill, and confined to bed, unable to have her meals, and for some days apparently insensible. She had been seen by Drs. Williams and Quain, who, I believe, regarded her anomalous and varying symptoms as mainly of hysterical nature. Towards the end of August, however, after a "seizure," in which she had been unconscious, both eyes were much inflamed, and the pupils dilated. She complained that she could not see much, and that she was nearly blind with the right eye. The condition of the right eye seems, however, to have improved gradually, until the sight might be declared nearly natural, but the left grew worse, so that three weeks after, when I saw her with Mr. Noverre, I found the eyeball much inflamed, scarlet injection of the conjunctiva, and turgidity and flexure of the subconjunctival vessels. The pupil fully and immovably dilated. The eyeball was not very tense; in fact, but little more than normal tension was present. The optic disc was, however, cupped, and the veins dilated. The vitreous was not clouded. The pupil of the right eye acted freely, and there was no abnormal ophthalmoscopic appearance visible within the eye. There was, however, considerable presbyopia. I did not ascertain its precise degree, owing to the excitability and distress of the patient: it was described as of quite recent invasion. The sight of the left was gone, not even qualitative perception being left, and the patient declaring herself insensible to the presence of a powerful light in a dark room. Under these circumstances, I considered the case to be one of absolute glaucoma, but having peculiarities in regard to the moderate tension of the eyeball, and the clearness of the media. I counselled iridectomy, but feeling the difficulties of the case, I advised a further opinion, and met Mr. Critchett in consultation

next day. He concurred in the opinion I had expressed, and advised iridectomy without any delay, kindly offering to assist me that day in the operation. The patient, however, could not make up her mind that day, but next day she was desirous of having the operation performed at once. Mr. Critchett having been called from town, I operated with the assistance of Mr. Noverre, Dr. Anstie giving chloroform. While completing the iridectomy, a slight movement occurred of the patient's head, which lead to a partial dialysis of the iris extending from the incised edge. There was some effusion of blood into the anterior chamber. The pain over the brow, its congestion, and irritability were set at rest by the operation, but there was not the slightest improvement in the vision, even after the blood effused had been absorbed. The patient has remained totally incapable of appreciating light from darkness. Having the peculiar characteristics which sometimes exist in highly hysterical women, she has since endeavoured to produce a simulated paralysis of the right pupil by instilling atropia drops in the eye. She had heard the matter of dilatation much discussed during her previous illness, and became aware of the local uses of atropia. The simulation was, however, palpable. The dilatation of the pupil by atropine is, indeed, always discernable by the surgeon who is accustomed to ophthalmic investigations, and does not resemble that of glaucoma, being more complete, and unaccompanied by the characteristic signs. Moreover, prior to operating, I had instilled one drop of the solution of calabar extract (1 drop = 4 grains of the bean), which is insufficient to overcome the dilatation of even feeble atropization, but sufficed to contract firmly this pupil, so as to facilitate its excision.

The very marked and complete intermission of the glaucomatous affection in the first case, its alternation in the second, and the subsequent supervention of absolute glaucoma of the eye, in each case, are clinical circumstances which seem to me worthy of note. Intermissions

so marked are indicative of the nervous relations of the malady. The peculiar temperament of these patients may have tended to bring this element into especial prominence in their cases. The view which supposes that iridectomy acts beneficially by arresting the progress of hypersecretion by the exsection of the nervous plexus and ganglia of the ciliary is that which accords best with the disposition of the parts. The dilatation of the pupils, and the relaxation (tortuosity and engorgement) of the vessels in glaucoma are pathological circumstances which point to the same conclusion. As to the action of iridectomy being beneficial by section of the ciliary muscle, or in reducing its tension in spasm, I am entirely sceptical. The stated circular muscle described in connection with the ciliary has, I am convinced from repeated investigation, no existence as a separate muscle. In the bird there are assuredly no circular muscular fibres whatever in the ciliary region, either in the position assigned to them in the human eye by Muller, or in any part of the muscle. I have very numerous sections and preparations which will sufficiently prove this. In the human eye, in a vertical ciliary section, cut ends may be seen of oblique fibres, which may or may not be muscular; it is difficult to decide whether these fine soft fibres are muscular or fibrous, for the human ciliary altogether is composed of fine soft unstriped fibre. The fibres, however, correspond to connective tissue fibres in birds, where the distinction is, of course, easy enough, as both iris and ciliary of birds are made of striped fibre. However this may be, there is certainly no *circular ciliary muscle* in the human eye, and a section such as that effected in iridectomy could have no effect in reducing the tension of the muscle. In examining the tissues of the eye, I have been very much struck, not only with the mass of nerve fibres which form a plexus amongst the fibres of the ciliary muscle, and the number of ganglion nerve-cells discoverable there, but with the great plexus of nerves which is supplied to the iris, and which are not,

perhaps, so fully known to anatomists, although I see that they have been well described by Donders. As I have not




seen them mentioned in the most recent descriptions or in the anatomical prefixes to Wecker's recent and excellent book, or figured anywhere, and they are of especial interest in connection with iridectomy, I may be permitted to append a drawing of the nerves of the iris of a bird from a preparation which I possess, and shall be happy to show to those interested.

The drawing was very kindly made for me by Mr. Lockhart Clarke, as I have not the necessary skill as a draughtsman; and such drawings are best made by those who have some anatomical knowledge of the object. It represents these nerves as seen under an object-glass of $\frac{1}{7}$th inch. The plexus is made up of small bundles of nerve-fibres at the ciliary margin *a*, but near the pupillary margin these cords become progressively finer, and ultimately are reduced to single nerve-fibres. The iris was prepared in chromic acid solution and then rendered transparent by soaking in glycerine and coloured with carmine.

## ON THE EFFECT OF INJURIES TO THE FIFTH NERVE, ON THE NUTRITION OF THE EYE-BALL, AND THE FUNCTION OF SIGHT.

(Continued from Vol. IV, Page 381.)

By Jonathan Hutchinson, F.R.C.S.

In a former paper on this important subject I have recorded cases in which diseases of the trunk of the fifth nerve, occasioning anæsthesia, were followed by destructive inflammation of the eye-ball,* and some of which seemed to me to favour the old belief that this nerve is of direct efficiency as regards the maintenance of the normal nutrition of the eye. Subsequently† I have alluded to other less direct cases, in which reflex disturbance of the nutrition of the eye-ball or of the centres of vision, seemed to have followed injuries to branches of the fifth at a distance, or even persistent irritation of a distant branch, such as that caused by tooth-ache. On this question the doctrines prevalent some years ago were clear and decided, and supported the belief that such reflected consequences were not infrequently observed. That an injury to the frontal nerve, for instance, was capable of causing amaurosis, no one doubted. On this point, however, as well as regards the direct influence of paralysis, modern physiological experimenters have been sceptical. Relying partly upon the circumstance that experiments on animals have been without result, and partly upon the inconclusive character of the clinical facts as yet recorded, a considerable number of our best surgeons at the present day are incredulous on this matter.‡

Such being the state of opinion, it seems very desirable

* See Ophthalmic Hospital Reports, vol. iv, page 189.

† See ibid., page 381.

‡ The list of the heterodox does not include the name of Dr. Brown-Sequard, who is a vigorous supporter of the old opinion as to reflex disturbances. Vide "*Physiology of Nervous System*," page 156.

to record, carefully, all new evidence that may come to hand on this subject. The cases to which I now invite the reader's attention have come under my care during the last few years, and are part of those comprised in my Essay on "Injuries to the Head, and their Effects," to which the Astley Cooper Prize has recently been awarded. This Essay is now the sole property of Guy's Hospital, and is deposited in the library of that Institution. The trustees of the prize have, however, with much liberality, given me permission to publish such parts of it as I might think desirable, of which permission I now avail myself.

*Contused Laceration of the left Eyebrow—Immediate symptoms of injury to the Frontal Nerve—Failure of the left Eye within seven weeks of the accident—Photopsiæ, but no pain in the globe—Subsequent failure of the other Eye—Deafness—White Atrophy of the Optic Nerves—Patches of absorbed Choroid in the left Eye.*

Moses Isaacs, æt. 37, married; a steady, temperate man, with a large family. He came over from Melbourne in order to have advice as to his sight, being almost blind. On September 24, 1863, he was admitted at Moorfields, under my care. The following was his statement:—"I was standing one day in the High Street, Melbourne, when a man, in a passion with another man, in mistake struck me with an iron bar, a violent blow on the forehead. I was felled to the ground and was taken up insensible, and remained quite stupid for a couple of hours. The wound bled very much. A surgeon dressed it, and I soon got well. Seven weeks after this I was driving a cart near Forest Creek, when suddenly I found that I could not see, and was obliged to get another man to take care of the cart. My left eye was now quite blind; it had been gradually failing ever since the accident. After this my left eye never improved, and my right eye got worse and worse. I kept at work for some months longer; but, getting nearly blind, I was advised to come to England. When I sailed I could still see a little, but whilst crossing the equator in very hot weather, my sight quite left me. Still, I can see a little now and then with the right eye, and this very morning I walked a quarter of an hour in the

street alone, and recognised two people." On being asked as to the pain he had after the accident, he said that it was very painful just over the eyebrow in the wound, "pricking and drawing like," and he added, "I had the same feeling on the top of the head where I had not been struck." The part which he pointed out as that in which this pain was felt was on the left side, about the middle of the parietal bone, and therefore over the distribution of the frontal nerve.

Further questioning elicited that he had not suffered from headache nor from vomiting; that he had been liable to occasional swimming feelings in his head before the injury, but had enjoyed excellent eyesight. Since the accident he had lost flesh very much, but this he attributed to his having been desponding about his eyes. During the last eight or nine months his hearing has been failing, and he is now deaf in both ears, so that it is necessary to shout loudly. His left ear failed first, and is the worse of the two. He has been much troubled with noises in the head, ringing, &c. Flashes of light have been very frequent, and he saw them early after the injury. He never had any material pain in the globes. He is very sensitive, both to heat and cold, as they make his eyes water, and cause flashes of light; on this account he dare not, he says, go near a fire. The senses of smell and taste he considers perfect. Memory good, and no paralysis of limbs, either as regards motion or sensation. The sensation in the two sides of the face seems equally good, but on the left forehead he is decidedly hyperæsthetic as regards slight pricks, &c., and flinches sooner than on the other. He says it sends a shooting pain to the scar. He complains of having had a good deal of pricking and itching in the scar.

The scar is an irregular one; it commences almost over the inner canthus, just on the supra-orbital ridge, and extends outwards and upwards across the eyebrow, nearly to the outer angle. It is conspicuous and the wound has clearly been a deep one. I fancied that the bone beneath was a little uneven, but could not be certain. There is no thickening, and but little tenderness about the scar.

When he came to me at the Moorfields Hospital, he could but just with the right distinguish dimly the outlines of the largest objects; with the other, he could not tell light from darkness. The pupils were large and nearly round; but the iris above the

pupils was much narrower than below it. Both pupils were extremely sluggish, almost motionless. In the evening I examined him by candle-light. His amount of vision was much as in the morning. He could just dimly make out large objects, but in walking across the floor he ran against chairs, &c. Aspect, decidedly amaurotic.

The pupils dilated with atropine very slowly, and but little. In the right, the choroid everywhere of a homogeneous orange red; no single vessels visible. Optic disc, abruptly margined and conspicuous; grey white; arteria centralis and lesser arteries not discoverable; vena centralis still of considerable though much reduced size. In the left, the condition of the optic disc was exactly similar to that of the right, and the choroid was of the same velvety orange red appearance. The only difference in the fundus in the two was in the presence of certain very abrupt patches in the left choroid. A patch of considerable size, with most abrupt margins, was seen near the yellow spot; the choroid was removed wholly, and the white sclerotic was seen with a central island of black pigment. Near to this were several other aggregations of black pigment in the choroid, but attended by much less absorption of choroidal tissue.

It is, I think, clear that the cause of the amaurosis in this case is central. However produced, the atrophy of the optic nerves has, in all probability, originated in changes at their central origin. Had the injury to the frontal nerve any influence in producing this? In the first place let it be admitted that the evidence is strongly in favour of the belief that the left frontal nerve really was contused and injured. Then next let it be noted that the left eye began to fail immediately after the injury, and that it failed sooner and much faster than its fellow. Let us remember that he had a referred pain in the vertex of the left side of head immediately after the accident, and that, even now, eighteen months after the accident, he has a degree of morbid sensitiveness to irritation in the supplied tract of skin. Nothing could be more positive than the man's own conviction that his blindness is the direct result of his injury; and, looking at the order of sequence of symptoms, there can be no wonder that such is his impression.

I do not know how to interpret the patches of disorganised choroid in the left eye. It is possible that they may have been

caused by the early and more active morbid processes induced. From their appearance, it is certain that they are of long standing. There is no choroidal disease at present in advance.

The man expresses himself as being quite certain that the eye-ball itself was not struck, and is quite clear that he could see well for some days after the accident.

His deafness is probably due to similar disease to that by which his eyes have been affected, *i.e.*, central changes inducing atrophy of nerves.

*Gradual Blindness of the Left Eye after a Contused Wound of the Left Temple.*

Cornelius Leggatt, a farrier, æt. 53, who came to me on account of an injury to his right eye, gave me the following history of the loss of his left one :—Both eyes were perfect until about 28 years ago, when he received a blow on the left temple from a stone. The wound bled very freely at the time, but quickly afterwards healed. The eye itself was not struck, and it was not blind, nor materially affected as regards its sight until some time afterwards. Within a few weeks he found the eye irritable, "watery, and weak, especially in cold weather." Gradually he lost sight, and in about two years afterwards was quite blind. He attended the Moorfields Hospital, and was told that nothing could be done. He never had any pain in it, nor any photopsiæ.

At present he has no perception of light with the left eye. The pupil is round, rather larger than the other, and quite motionless. The iris is tremulous, as if the lens were displaced. The globe is a little turned outwards. There is not the least congestion of the globe, and the iris is brilliantly lustrous.

His other (the right) eye remained perfect until a blow received the other day.

Unfortunately I have mislaid my notes of ophthalmoscopic examination in this case, and also the man's address.

*Large Scars in the Forehead from Lacerations five years ago—Loss of Sight for two years in the Left Eye—Atrophy of Optic Nerve.*

Mrs. Simmons, from Aberystwith, æt. 70. Five years ago she was knocked down in the street, and had severe contusions on

the forehead. At present a large scar is visible in the middle of the forehead, extending towards the left side. There is another deep scar extending across the left eyebrow. She states that it was 11 weeks before the wounds healed. She did not notice any failure of sight until a year and a half ago, when her left eye began to fail. She can see well with the right eye. She complains of having "swimmings in her head." Pupils of equal size; both sluggish. She cannot count fingers with the left eye. Although atropine was three times introduced, the pupil scarcely dilated. The optic disc is grey, and there is a small irregular crescent on its inner side. It is slightly sunken. The veins are very large and dark. The choroidal pigment is accumulated in patches. The other eye appears normal, except, perhaps, that the nerve is a little cupped; but in this the effect of atropine has been but very slight. She can see well with this eye, but as she cannot read it is difficult to test her sight accurately. There is no increased tension of either globe, and the general signs of glaucoma are wanting. She has had no pain in the globes. The cupping is rather that of atrophy than of glaucomatous pressure.

*Injury to the Right Frontal Region, and Contusion of the Face, followed by Atrophy of the Lachrymal Gland and Absorption of Fat from the Orbit—Much Impairment of Sight for a time, but subsequently recovered from.*

The subject of the following case was under the care of my senior colleague, Mr. Dixon, who kindly gave me permission to investigate and record it.

Johnson Smith, a stout, florid man, æt. 42, came to the Moorfields Hospital on March 23, 1863. His face presented the singular condition represented in stereoscopic portrait No. 31 in my collection.

On New Year's Day, 1863, he fell from a ship's stage, 25 feet, and was taken up stunned. The accident occurred at seven in the morning. He was taken to the hospital, and until ten o'clock in the same morning was quite insensible. He then regained sensibility, and soon recovered. He left the hospital in nine days, quite well, except that the wound in the forehead was not entirely healed. In 18 days he returned to work. The right side of his face was, according to his statement, very

much bruised, but no bones were broken, and the only laceration was the one on his right forehead, of which the scar remains. It is an inch and a half long, over the outer half of the right eyebrow, and an inch and a half above it. Its inner end does not reach so far inwards as the middle of the eyebrow. It is now perfectly sound, and, according to his statement, the wound healed kindly, and very quickly. He appears to have had a severe contusion. He feels sure that his sight has got much worse during the last few weeks. He has a good deal of writing to do in the evenings, and his sight has failed so much that he cannot see his lines. He is sure that before the accident he could see with both, but was, indeed, always accustomed to use his right eye most, as his left was somewhat defective. After dilating the pupils with atropine, I found that there was in the left eye (the uninjured one) a considerable posterior synechia at the inner and lower part. At the same part, behind the iris, were also some considerable opaque bands, extending into the vitreous at the ciliary region. These had been quite concealed whilst the pupil was contracted. They must, I think, have resulted from some former disease, and probably had nothing to do with the recent accident.

With the ophthalmoscope nothing abnormal was noticed in the fundus of the right eye. As to swelling of the orbital tissues from the blow, he states that for several days his eye was swollen up, and the lids level with the cheek. It was subsequently very black. At the end of the nine days, however, when he left the hospital the swelling had disappeared, and, according to his statement (probably erroneous) the eye was already sunken somewhat.

*Present state.*—The right eye is very considerably sunken in the orbit. There is a deep hollow under the superior orbital ridge, into which the finger can be passed. No lachrymal gland can be felt. There is also a certain amount of hollowness in the lower part of the orbit, but not so much as to be very perceptible. The pupils are of equal size, and the left is fairly mobile; the right is less so. He can read No. 4 with the right eye. With the left he can with difficulty read No. 19.

August, 1863.—He can now read No. 1 with the right eye, and can see anything in distance perfectly. With the left he can only read No. 16, and cannot tell the time by the distant

clock. It is possible that he may have had some former injury to this eye. It is not improved by cataract lens.

He has very greatly improved in sight whilst taking pot. iod. gr. iij. ter die. The condition of the orbital tissues is just as it was. There is still the great hollow above the globe. He is in excellent health.

*Blindness of one Eye, and Liability to Epilepsy one month after Contusion of the Head.* Query.—A malingerer.

Thomas Osborne, a fruit hawker, æt. 18, had an altercation in the street with an Irish woman, who seized his pint measure from his stall and beat him violently about the head with it. He was stunned, and had severe scalp lacerations. He was carried into the hospital in a state of partial insensibility. There was a wound over the left parietal bone several inches in length. He lost a large quantity of blood. Whilst in the hospital nothing particular shewed itself. The wound healed well, and he was discharged in a fortnight. The injuries were received on September 13. On October 6, 1864, I was requested to examine him, as he could not see with his left eye. It now appeared that on two occasions since his discharge from the hospital he had had epileptic fits. One of these occurred in the police court, probably under much excitement, and the other a week later.

October 6.—The lad looks quite well; he has no squint, and nothing abnormal is to be seen in either eye. The pupils are of equal size, and act well. He avers that he can see very little with the left eye, only enough to distinguish very large objects. He sees the "blur of a candle flame," but cannot distinguish it clearly. Sees better from the outer corner of the eye. I tried him by placing a strong prism before his sound eye, both being open. He said he could see only one object, and persisted in his statement.

His account is, that he first found that his eye was failing on the second day after his leaving the hospital. Whilst in the hospital he could see as well with the one as the other. It has got much worse since he first found out it was failing. He complains much of headache, and says he is "dizzified and nervous." He says that the pain in his head will not let him sleep, and that he is so weak he cannot work. His smell and

hearing are good; he complains of a humming noise in both ears. There is a large recently formed scar, crossing outwards from near the middle of the scalp on the left side. There is a little thickening about the part, and he flinches much on the slightest examination of it.

His bearing and manner of stating his symptoms are such as to strongly suggest the suspicion of malingering. I tried him repeatedly with prisms and coloured glasses, but never could get him to admit that he saw double. He, however, several times, when I put a strongly coloured glass before the sound eye, asserted that the candle looked all right, and was not coloured; but this may have been from sheer stupidity. I do not, however, suppose that it was. The pupil dilated well with atropine, and on examination with the ophthalmoscope I could not detect the slightest deviation from the healthy state.

On covering the sound eye he said he could only see a glimmer of a candle placed in front of him; but when I used coloured glass, he would not admit that this glimmer was altered. On several occasions he was evidently considering what he should reply to my questions. Once I noticed him winking the lids of the left eye with great rapidity, and clearly by effort. Although, as stated, the prism test failed to detect deception, yet I am still much inclined to think that his present symptoms, epilepsy, headache, and blindness, are all feigned.

The above notes were written out a year ago. I have not seen the lad since.

(To be concluded.)

## LOSS OF THE LEFT EYE FROM THE LODGEMENT WITHIN IT OF A PORTION OF A GUN CAP.—INFLAMMATION OF THE STUMP MORE THAN SEVEN YEARS AFTER THE INJURY, FOLLOWED BY SYMPATHETIC OPHTHALMIA OF THE RIGHT EYE.—CLINICAL REMARKS.

By George Lawson, F.R.C.S.,

*Assistant-Surgeon to the Royal London Ophthalmic Hospital, Moorfields, and to the Middlesex Hospital.*

George S., æt. 33, by trade a confectioner. Eight years ago, by way of amusement, he was exploding some percussion caps by striking them with a hammer on a stone. The caps were cheap ones, which he had procured at what he called a cheap Birmingham shop, in the country, at the price of 25 for a penny. Whilst so engaged a fragment of one of the percussion caps flew into the left eye, and there lodged itself.

The eye inflamed and suppurated, and, after much suffering, shrunk to a mere stump; but the foreign body, as far as he knew, still remained in the shrunken remnant of the eye. From that date, for more than seven years, he was completely free from pain; the lost eye gave him no inconvenience. The sight of the right eye was remarkably good, for he was a crack shot at long distances in the volunteer company to which he was attached.

Last February, for the first time, the stump of the left eye became painful and inflamed, and soon afterwards he noticed the sight of the right eye was foggy, but he suffered no pain in it. This attack continued about three weeks, the sight of the right eye becoming rapidly worse. Under treatment he recovered, but the sight of the uninjured eye was much impaired. Since then the stump has been repeatedly inflamed, and with each attack the right eye has sympathized, and on one occasion became acutely affected and very painful.

After each attack the sight of the right eye was materially injured, and although all irritation would for a time subside under treatment, yet he never regained any of the vision he had lost.

On September 22nd he applied to the Royal London Ophthalmic Hospital. The following was the state of the two eyes.

*Left Eye.*—A shrunken and contracted stump, inflamed, and looking red, and irritable. Through the centre of some cicatrix tissue, which occupied the place of the cornea, was projecting a metallic point, evidently the extremity of the piece of the percussion cap which had been so long lodged in the eye, and which was now making its way to the surface.

*Right Eye.*—Slightly pink and irritable. The cornea clear. The pupil fully the normal size, but fixed and completely adherent to the lens capsule, and the pupillary area of the capsule of the lens covered with a film of lymph. The striation of the iris very indistinct, and the anterior chamber very shallow, the plane of the iris having been approximated towards the cornea.

He is unable to read 20 of Jaeger's test types or to count fingers. He can only just make out the hand when held before his eye, or distinguish any large object in front of him.

He was at once admitted into the Hospital, and I removed the stump of the lost eye. On making a section of it, the piece of the percussion cap was seen to have made its way towards the surface, and was projecting by one of its edges through the cicatrix tissue in the front part of the stump.

The deep tissues of the eye were all so matted together as not to be recognised.

The man made a good recovery from the operation, and will continue to attend the Hospital as an out-patient. The right eye has decidedly improved. It is less irritable, and the pink appearance has disappeared. No amendment, however, can take place in the vision until some operation has been performed, as the pupil is bound down to the lens capsule, and the pupillary area is blocked up with lymph.

*Clinical Remarks.*—This case is a sad, but a very instructive one. It illustrates the danger of allowing a foreign body to remain in the eye, even though the eye for all useful purposes has been destroyed by it. Sooner or later it is certain to be a source of pain and trouble to the patient, and to induce an inflammation in the injured eye, which is peculiarly liable to excite a sympathetic ophthalmia in the sound one. In this patient there are some points worthy of notice.

1st. The injury was caused by the explosion of a cheap percussion cap. Unfortunately these cheap caps are made of an

inexpensive and brittle alloy, and scales of them often become detached during explosion, and fly off with such violence as to lodge themselves in any portion of the body with which they come in contact. In nearly all the eyes which are destroyed by percussion caps, and they are many, it will be found on inquiry, that the caps used were the toy, or the cheap ones, such as children buy for their play guns, or such as are employed in firing at targets in the streets for nuts.

2nd. The length of time which a foreign body has remained embedded in an eye, is no guarantee that the danger of its presence has passed. In this patient over seven years elapsed before it began to give trouble, but when the stump of the lost eye became inflamed, the sound eye was speedily involved in that terrible disease, now so well known as sympathetic ophthalmia.

3rd. The sound eye in this patient was sympathetically affected without its suffering in the first attack any pain as a warning of its presence, and this is one of the peculiarities of the disease. It will often creep on unheeded by the patient, the impairment of the sight being so gradual as at first not to draw sufficient attention to it; and it frequently happens that the disease is fully established before it comes under the surgeon's care.

Since the source of irritation, the stump of the lost eye, with the foreign body within it, has been removed, the other eye has decidedly improved.

Time must now be allowed for all irritation to completely subside, and after an interval of some months if the eye continues so long in a quiescent state, an operation will be performed to establish a new pupil, and if the lens on the removal of a portion of the iris, should be found cataractous, it will be removed. There is yet a fair prospect that the man may recover a useful eye.

## TREATMENT OF TWO CASES OF PTERYGUIM BY TRANSPLANTATION.

By George Lawson, F.R.C.S.,

*Assistant-Surgeon to the Royal London Ophthalmic and the Middlesex Hospitals.*

In the two following cases I treated the pteryguim in each eye by transplantation, after the manner recommended by Desmarres.

The operation is easily performed, and its results, as far as I am able to judge from the time the patients were under my care, very satisfactory.

The lids being separated by a spring speculum, I seized with a pair of finely toothed forceps the extremity of the pteryguim close to the cornea, and then with a pair of fine scissors clipped away carefully and accurately its attachment to the cornea, still holding the pteryguim between the blades of the forceps. I then made a cut with the scissors through the conjunctiva, along its upper border, and then another through the same membrane along its lower border, in the direction of the dotted lines in the diagram No. 1. At the point of the lower free cut edge of the conjunctiva, to which I wished to insert the apex of the pteryguim, I made a small snip with the points

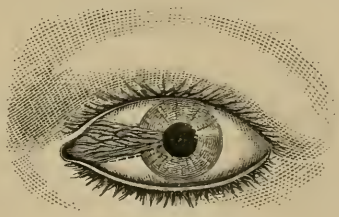


Fig. 1.

of the scissors, and then fastened it *in situ* with a single suture of very fine thread, never having released my hold

of the pteryguim with the forceps until the operation was completed (fig. 2). I had an opportunity of seeing each case about one month after the operation, and the pteryguim in each eye in its new situation was gradually shrink-

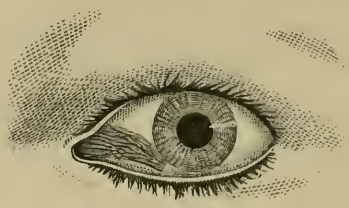


Fig. 2.

ing. In cutting away the insertion of the pteryguim from the cornea, a Beer's knife or a fine scalpel might be used to dissect it off, in preference to clipping it away from its attachment with a pair of scissors.

The advantages of this mode of treatment are:—

1st. There is no loss of conjunctival tissue.

2nd. The pteryguim does not recur.

In its new site it is reported to gradually shrink, and to cease to give the patient any annoyance. I have on several occasions abscised a pteryguim, and brought together the edges of the conjunctiva as accurately as possible, but certainly in two instances I have had to repeat the operation more than once, and in one case the cicatrice which followed the loss of the conjunctiva on the inner side of the eye caused a considerable limitation of its movement outwards.

Case I.—William G. came under my care on August 29th of this year. For the last eight or nine years he had been engaged in mining in Australia. About four years ago he had an attack of purulent ophthalmia, and he dates the commencement of his present affection of the eyes from that period.

He has now a pteryguim in each eye.

In the *left eye* it is very thick and fleshy, and extends quite up to the level of the margin of the pupil, when not dilated.

In the *right eye* it is less developed, but still very conspicuous. It has encroached upon the cornea, but has not reached as far as the pupillary edge. In each eye I transplanted the pteryguim downwards in the manner just described. Slight conjunctival redness followed, but in four days the suture was removed, and the patient left the hospital.

Case II.—George W., æt. 53, came to the hospital on August 22nd of this year, suffering from a pteryguim in each eye. His employment is on the water. He is constantly engaged at work on the oyster beds at Colchester.

In the *right eye* the pteryguim is large, and extends over the cornea quite up to opposite the edge of the pupil.

In the *left eye* it is much smaller, and only encroaches slightly on the cornea.

In this man I also transplanted the pteryguim in each eye downwards. Very little irritation followed, and he left the hospital on the 28th.

About one month afterwards I saw each of these men. The pteryguim in each eye was much shrunken. They were pleased with the result, and had experienced no inconvenience from the operation.

## A CASE OF PYRAMIDAL CATARACT, WITH MICROSCOPIC EXAMINATION (BY PROFESSOR C. SCHWEIGGER) OF THE LENS AFTER EXTRACTION.

By A. Samelson, M.D. (Manchester.)

John Procter, hooker, 23 years old, pock-marked, presents himself with a cataract in his left eye. The iris of this eye appears greenish-grey, whilst that of the sound right eye is of a light blue colour. The pupils of both eyes act equally well. The left eye, in addition to the cataract, is affected with a faint nebulous opacity occupying the centre of the cornea, a moderate lachrymal obstruction, and a slight divergent squint. In respect to the latter, we meet with this peculiarity, that the internal rectus, far from being weakened by its permanent extension, is able to carry the cornea so deeply into the great angle as to hide almost the entire inner third behind the caruncula, whereas in the right eye, under the greatest effort of its inner rectus, the corneal margin remains nearly a line distant from the caruncula.

The cataract, said to have been left behind by "the small-pox and measles" when the patient was three years of age, presents the following characteristics. A white cone, very conspicuous, much like a minute mamilla, of an apparent depth of $1\frac{1}{2}'''$ and of smooth surface, is seen to project through the pupil into the anterior chamber; in profile, the apex seems almost to touch the posterior surface of the cornea. There appears to be an interval between the base of the little pyramid and the sort of wider socle, on which it seems to rest with a short and narrow pivot. The surface of this socle is not of the uniform smoothness and whiteness of the pyramid, but has an irregularly burrowed, or, as it were, curdled appearance.

The patient distinguishes the back from the palm of a hand, and, when turned from the light, counts fingers and tells their movements; he sees better when the object is placed toward his left side. After the pupil has been well dilated by atropine he is just able to see the ear or nose of a person standing before him, but there also becomes visible a black zone, about $1\frac{1}{2}'''$ in breadth, surrounding the "socle," the circumference of which is seen to be irregularly serrated, and a minute knob here

and there projecting from it; the short pedicle intervening between it and the pyramid is now more plainly discerned. On looking into the pupil from the right side, at an angle of about 15°, we perceive a dull red glare coming from the fundus, of the details of which, however, nothing can be made out. The case was presented to the Manchester Medical Society.

On the 19th October, 1864, the cataract was removed by linear extraction, the incision being made at the outer side of the cornea. I performed also a small iridectomy, on the one hand to facilitate the exit, if possible, of the whole of the cataract, on the other, to obviate inflammatory consequences. These I was led to apprehend by the discoloration of the iris, as pointing, in my view, to bygone irido-choroiditis, which, though it left the pupil free, might have occurred contemporaneous with the formation of the cataract, and damaged the deeper parts of the eye sufficiently to account for the existing degradation of sight. For, this, after the action of the mydriatic, appeared to me disproportionate, unless it was to be brought home entirely to the long exclusion of the eye.

I succeeded in bringing away the cataractous pyramid entire, together with a number of small, irregular particles, obviously fragments of the "socle." The pupil, however, even in its centre, did not appear normally black, and there remained, skirting the pupillary margin, a greyish-white ring of cataractous substance, varying, but at its widest not exceeding 1‴, in width. This, in course of time, has almost entirely become absorbed; but the patient's vision is not in the least improved by the operation; he is, however, quit of a very bad disfigurement. The lachrymal obstruction had been removed without difficulty by Weber's method. The divergence was not attempted.

Ophthalmoscopic examination, somewhat hampered by the corneal haze, discloses, besides slight pigmentary anomalies in the choroid, an optic disc presenting all the characteristics of advanced atrophy: the lamina cribrosa very distinct, the remaining arterial twigs most attenuated, that blotchy appearance of the likewise scanty veins, so common in cases of inveterate squint with its attendant amblyopia ex anopsia; and the presence of the retina is indicated by a small number of its vessels only.

The morbid specimen was seen with interest by Professor

von Graefe, and at his request, by Prof. Schweigger subjected to microscopical examination, of the results of which the latter was kind enough to send me the following account:—

"The cone, measuring about 2 mm. in height, and at its base about $1\frac{1}{2}$ mm. in width, under a low magnifying power presents a large number of fine longitudinal folds, and at its base merges into an amply-folded glass membrane. This, though greatly thinned, is yet, by the presence of many disaggregated remnants of the intra-capsular cells, characterised as the atrophied anterior capsule. In conjunction with the latter we find a thick mass, which, under a higher magnifying power, appears striped and stippled, becomes much clearer when acted on by diluted acids, and, together with a good deal of cholestearine and other spear-shaped crystals so frequently occurring in metamorphosed lenses of the kind, exhibits distinct indications of a delicate glass membrane of recent formation. Longitudinal sections of the (previously hardened) cone* show it up to the apex to consist of a mass striated parallelly to the surface of the lens, and quite of the structure habitually met with in transverse sections of capsular cataracts. The striæ which can easily be torn out into thin lamellæ, on the smooth surface of the cone cohere intimately with each other, and thus present the semblance of a delicate membrane which, however, cannot be isolated as such. Nearly corresponding to the base of the cone we discover a fatty or calcareous mass, further on a striated texture, and further again more amorphous masses of the same nature as the loose spherical fragments which the bottle contained in addition to the cone."

"To the question, then, which here chiefly concerns us, whether the cone was interior or exterior to the capsule, we do not obtain a satisfactory answer; in the transverse sections, to which we had to look for a solution, no trace whatever of a capsule was found. Nevertheless, it appears to me highly probable that the whole mass was invested with a thin, atrophied anterior capsule, inseparably coherent with the surface of the cone."

* Professor Schweigger retains beautiful specimens of these sections which he showed us at Berlin, on his return from his journey to London, where he had undertaken the examination.

## OBSERVATIONS ON DEFECTS OF SIGHT IN DISEASES OF THE NERVOUS SYSTEM.

By J. Hughlings Jackson, M.D.,

*Assistant Physician to the National Hospital for Epilepsy and Paralysis, and to the London Hospital.*

(Continued from Page 446.)

It is very difficult to comment on cases of amaurosis in a Journal devoted to the special consideration of defects of sight without running the risk of being too diffuse. It is not easy to find a satisfactory arrangement. Some of the cases I relate have very wide bearings in physiology, pathology, and clinical medicine. An arbitrary arrangement which exaggerates one aspect of the cases would be really to cover up disorder. The last recited case refuses to come under any one particular heading. Although for convenience of space we speak of it as a case of amaurosis, we must also think of it as:—(1) A case of syphilitic disease of connective tissue. In this plane of thought the fact that the connective tissue disease is in the pia mater of the hemisphere is comparatively unimportant. I suppose it would not differ in any essential particular from a cellular node of the buttock, or muscular node of the tongue, or what I may call a "liver node." (2.) As a case of disease of the hemisphere. Here again, so far as the symptoms due to loss of a certain part of the hemisphere go, it is of no importance whether its substance was diminished by syphilis, cancer, tubercle, or softening. The most important, or at least the most striking fact, was that with disease of this part of the right hemisphere speech was not affected. (3.) As a case in which a "foreign body," viz., a syphilitic tumour, had produced general disturbance in the brain leading to amaurosis, &c. Here a consideration of the nature of the disease comes to be of importance, as, so far as I know,

mere softening does not excite such changes; but now its position is of much less consequence,—as regards the amaurosis at least. (4.) The clinical history suggests points of very great importance. It would have been thought, before Helmholtz discovered the ophthalmoscope, that, there being syphilitic disease of the connective tissue of the hemisphere, the amaurosis would be due to syphilitic disease of the choroid. The case corrects this easy way of concluding.*

I think it but right to make the above statement, but the reader will no doubt gladly excuse me for not dwelling on all the points in it. To speak of the cases as widely as one ought to think of them, would be to write the greater part of a treatise on diseases of the nervous system. In the former part of this paper I related cases, and made remarks, simply with the object of shewing the importance of the ophthalmoscope to the physician in his investigations of cases of disease of the nervous system. In this part I shall chiefly consider amaurosis as it occurs from disease of the hemisphere.

* This lateral way of thinking is not safe. I have had, during the last six months, two patients under my care for paralysis of several cranial nerves. The cause during life was clearly syphilis; and there was found, after death, syphilitic disease of the (arteries of) liver, and around the arteries of the brain. Now each of these patients had aphonia. The conclusion that they had actual disease of the larynx itself was the readiest and easiest way of explaining it. The case shows that the use of the laryngoscope will help the physician as the ophthalmoscope does. Dr. Morell Mackenzie found, on laryngoscopic examination, that the larynx was healthy, and that the aphonia was due to disturbance of its function, viz., to paralysis of one vocal cord. He was bold enough also to say that the paralysis was of the crico-arytenoidens porticus muscle. The larynx in each case was carefully examined by Mr. Frederick Mackenzie, and nothing was found except partial atrophy of the above-named muscle. A rational explanation of this functional disorder was given by the autopsy. Again, in defects of sight let us say in hemiplegia with Bright's disease, without the opthalmoscope we might infer that the changes were those characteristic of Bright's disease. So they were in Case XI. But if we examine we may find, as in Case XII, that they depend on neuritis from disease of the hemisphere, the Bright's disease being connected with the failure of sight in but a roundabout away.

I will, however, first say a few words on paralysis of the third nerve, which in the last case I have related complicated the amaurosis and hemiplegia from disease of the hemisphere. Paralysis of this nerve is a very rare complication of hemiplegia, and this is the only instance I can call to mind in which I have found it with hemiplegia and double amaurosis. I have only once seen hemiplegia on the right side, with loss of speech, complicated with paralysis of the third nerve. Disease of the motor tract, above the crus cerebri, and, *à fortiori*, disease of the hemisphere, do not produce complete paralysis of any cranial nerve. When there is paralysis of a cranial nerve and hemiplegia, with double amaurosis or loss of speech, the probability is that there are two lesions. We know that in disease of the inner and under part of the crus cerebri* we have hemiplegia on one side, and paralysis of the third nerve on the other. I thought during the life of the patient that the disease was so placed in him. I imagined that there was disease of the right crus, and that this disease produced amaurosis, by involving first the optic tract of its own side, and then by extension the one of the other side. Further experience makes me more cautious in concluding that there is disease of the crus when these two symptoms are found together. If they come on together suddenly, I should feel pretty confident that the crus was diseased, but in chronic cases, where one follows the other, the diagnosis of two lesions, one of the hemisphere and one of the trunk of the third nerve, would be just as likely. Moreover, I have doubts whether disease of the optic tracts would produce the ophthalmoscopic signs of neuritis. I had under my observation for some time a case of hemiplegia, with hemiopia (Wollaston's disease). There was besides paralysis of each third nerve, although on one side not complete. This patient died, but I could not procure an autopsy. During the stage of hemiopia, when the dis-

* A most valuable paper on disease of this part of the brain has been published by Dr. Hermann Weber, Med. Chir. Trans. 1863.

ease of the optic nervous system must have been of one optic tract only, the discs looked quite normal; but before the patient died he became blind, and then the discs were quite white. There was however no trace of neuritis. The disease here must have been of or near to the crura cerebri.

In Zehender's Ophthalmic Journal, August, 1864, is related a case* which is of great interest in this connection.

The great interest Case XIII. had for me, however, when I had made the autopsy, was as one of disease, involving, among others, a particular convolution, the fellow of which in the left hemisphere is, according to M. Broca, the seat of the faculty of articulate language. Although I have greater (and increasing) doubts than I had as to the propriety of using the term "faculty" at all, and greater doubts still as to the possibility of locating any faculty, if there be one, in a particular convolution, I believe that M. Broca has conferred a great boon by introducing method in an inquiry which had been rather confused.

At the time when I made the autopsy I was much struck by finding amaurosis instead, as it were, of loss of speech. I have several times since found disease in this region (on the right side), with amaurosis, and with no defect of speech of any sort. I use the term "region," as the disease has never been very local, and, moreover, has not

* It was there reported in reference to a question I had asked as to the comparative frequency of hemiplegia on the right or left with amaurosis. In asking the questions I ought to have explained that I meant by "amaurosis," blindness of both eyes, due to optic neuritis. I may however say that, except in the case of hemiopia just mentioned in which, no doubt, there was disease of one of the crura cerebri and not of the hemisphere, I have not seen any other form of atrophy of the optic nerves with hemiplegia. Dr. Laqueur's interesting case therefore does not bear on the question I have asked. In other points of view his report and remarks are of the very highest value. The case looks like one of syphilitic disease of the arteries of the brain. This would account for the embolism, which, as he suggests, is the most likely explanation of the hemiplegia on the right side, with the defect of speech.

always been limited to the surface, so as to be easily defined as regards the position of convolutions. In several cases related in this paper, it will be found that the (right) fellow of M. Broca's (left) convolution was only one of several involved.

The simultaneous study of amaurosis and defects of speech has been thus forced on me. Apart from any theory* whatever, there is a great advantage in this, and I strongly urge it on the consideration of ophthalmic surgeons. It is simply impossible for a physician to do otherwise in working at diseases of the hemisphere. I may therefore be excused if I dwell more on defects of speech than seems *primâ facie* reasonable in a Journal of Ophthamology. For my part, I think Case XII. shews that ophthalmic surgeons cannot avoid studying the two symptoms, for there the lesion which caused at once defect of speech, next, insidiously, gave rise to the secondary symptom, neuritis.

Although I have grave doubts as to the localisation, or even as to the existence of any such faculty as that of language or articulate language, it is not contradictory to say that, so far as my experience goes, disease in only one region of the brain causes defect of speech. Facts force me to this conclusion. When I was first studying this point, it occurred to me that there might be particular parts of the hemisphere, disease of which produced amaurosis. A little thought, however, showed me that there was abundant evidence to prove that amaurosis resulted, not only from disease of widely different parts of the hemisphere, but even from other divisions of the nervous system, as the cerebellum, and also from tumours at the base of the skull. Yet in the cases of disease of the hemisphere that I have related, the damage has been rather wide-spread. Whilst, then, I still hold that the present evidence points to the conclusion that disease of any part of the hemisphere is

* I say apart from any theory, but I shall give my facts as I gathered them, viz., when my mind was full of the question as to the localisation of faculties.

associated with neuritis, I would raise the question whether, from more cases, and more precise localisation of the disease, we might not find this gross conclusion to be only partly the truth. Although it is, I think, impossible to fix on any one region of the hemisphere, as the seat of damage in neuritis, I think it not impossible that damage of some convolutions may be more likely to give rise to it than of others. If it were really so, the pathology, or rather the physiology of amaurosis, would still differ widely from that of loss or defect of speech, in which but one region of the brain appears to be affected.

I have been struck with the greater frequency with which I have found optic neuritis, with hemiplegia on the left than on the right side.

The facts I have observed go to prove that disease in a certain region of the left hemisphere produces loss of speech, and other facts go to shew that disease in the corresponding part on the right does not affect speech at all. Having found disease here on the right, with amaurosis, several times, I have been led to pay much attention to this part, and I was at one time sliding into the belief that disease of it might be more likely to induce amaurosis than disease of the other parts of the right hemisphere. It will, however, at once occur to every one that it would not be fair to conclude that disease of this part was more likely to produce amaurosis, because in my cases of amaurosis it might be the part most often involved. In the first place, I am more likely, as a physician, to be consulted in those cases of amaurosis from disease of the hemisphere in which this region is involved, and simply for this reason, that disease here is liable to involve the corpus striatum, and thus to produce hemiplegia, a symptom for which a physician is consulted. Again, I am under the impression that disease more often occurs in this position than it does in other parts of the hemisphere. Certainly effusions of blood do, as the region of the corpus striatum is very vascular.

In all the cases of neuritis in which I have made a

*post-mortem* examination, there always has been found notable organic disease in the head. But as I have repeatedly said, from this symptom, with or without headache and vomiting, we cannot during life predict where the intracranial disease is, nor what it is. If, however, there is hemiplegia besides, or, as I think, unilateral epileptiform convulsions, we have strong evidence that the amaurosis depends on disease of the hemisphere. The hemiplegia may precede or follow the amaurosis; it may be passing or permanent, but in all the cases in which it had been in any way present during life, I have found disease* of the hemisphere *post-mortem*.

Of course, if the hemiplegia be on the right side, the disease of the hemisphere is on the left, and if on the right the left hemisphere is diseased. Now it is only when the disease of the corpus striatum involves the hemisphere near it that loss of speech attends hemiplegia, and so it is, I think, only under such circumstances that amaurosis comes on after hemiplegia has been some time established, or follows it when it has passed off.† The association of hemi-

* I have seen, however, a case of amaurosis in the practice of Mr. Hutchinson in which the existence of slight weakness on the left side lead me incorrectly to diagnose disease of the opposite hemisphere. At the autopsy we found no disease of the hemispheres. There was a tumour at the base which grew so as to press on the left crus cerebelli, thus producing, as we know from Dr. Brown-Séquard's researches, disease here sometimes does, paralysis on the same side as the lesion. In such cases (as there was in Mr. Hutchinson's patient, some time after my erroneous diagnosis), paralysis of one or more of the cranial nerves generally comes on to show that the disease is at the base. The fifth nerve was involved. [It unsettles one's mind very much to see many cases. Since writing the last few sentences I have called to mind a case I saw in Guy's Hospital, in which, with neuritis, there had been paralysis of one fifth nerve, and yet at the autopsy the disease—a large tumour—was betwixt the hemisphere and the fifth nerve, and the pons crura, &c., seemed to be quite healthy.]

† When I afterwards speak of epileptic hemiplegia I shall point out that disease on the surface of the brain is attended with hemiplegia, although the obvious disease does not involve the motor tract. But in the text I am speaking of cases in which it may actually damage the motor tract, and the convolutions near it. So far as I know, extensive disease of the hemisphere above the ventricles need not produce any local paralysis, but only general weakness.

plegia with loss of speech or with amaurosis is then, as it were, an accidental one. It is true that it is an accident that nearly always happens with loss of speech, and not very unfrequently with amaurosis. Still the hemisphere may be alone affected, and then we have loss of speech only, or amaurosis only, according to the position, and, in the case of amaurosis, according to the position of the disease and other circumstances to be presently alluded to. As I have said also, loss of speech comes on at the same time as the hemiplegia—follows at once upon the damage—but amaurosis never comes on suddenly, as the result of injury to any part of the hemisphere. It will be seen then that the hemiplegia is to the ophthalmic surgeon a useful symptom in pointing out the position of disease in a given case, but it does not point to any peculiarity in the amaurosis itself, as just the same kind of amaurosis follows disease in very different positions. A utilitarian might then say that the hemiplegia is a symptom of little use in scientific investigation as the particular position of damage to the hemisphere seems almost to be a thing of no consequence, so far as its power of producing amaurosis is concerned.

Most people, however, will agree that it is always useful to recognise a fact whether its immediate importance seems to be great or little. But I wish just now to urge the study of hemiplegia with amaurosis, chiefly in order to furnish negative evidence as regards speech. During life the evidence can only have an approximative value, but in order that our autopsies may be of use, the other symptoms associated with amaurosis during life must be studied carefully. I think much good will be done if physicians and ophthalmologists make this a common ground of work. Case XIV. shows that if the physician does not examine the eyes, he will frequently lose a most important symptom. There does not appear to be great risk that an ophthalmologist, in attending to amaurosis, would overlook any considerable defects of speech, as these phenomena obtrude themselves. It is quite otherwise as regards defects of

sight, with total, or almost total, loss of speech, as Case XII. shews. There was nothing to direct my attention to the patient's eyes. I examined them as a mere matter of routine.

Case XIV. should be compared and contrasted with Case XII. Each of the patients was brought to the hospital with hemiplegia on the right side and loss of speech, and each of them had old disease of the optic nerves which clearly did not depend on the recent disease of the hemisphere, but which, to my thinking, does invariably depend on intracranial disease of some sort. In each of these patients I felt sure there were two parts diseased.

We all know that if a patient has Bright's disease and hypertrophy of the left ventricle, and degenerated arteries, he is liable to effusions of blood in various parts of his brain. As a rule, they affect the regions of the corpus striatum or the thalamus opticus, and thus generally produce hemiplegia. If the effusion of blood be in the hemisphere away from the motor tract, the patient may only have what he calls a "fit," and soon be well again. It was quite clear that the left corpus striatum and the adjoining hemisphere had been recently affected in each of these cases, and in Case XII. the former attack of hemiplegia pointed to old damage of the same region. Now I confess that in Case XII. I almost expected to find disease of the right hemisphere, as well as of the left, although there had been no left hemiplegia to point to it. At the autopsy the right hemisphere was quite healthy, so that I received a check which prevented my sliding into the conclusion that disease of only the right hemisphere produced amaurosis, as disease of the left only seems to produce loss or defect of speech. The autopsy in Case XII. shews, so far as one case can shew, that disease of the left hemisphere may first disorder speech and then give rise to amaurosis. In Case XIV., there was also a history of an old attack, viz., of fits, and these were very likely due to disease of the

hemisphere at a previous period. Whether that disease was of the right or left hemisphere, there was no evidence to shew.

In stating the mere fact that there is loss of speech or amaurosis, with hemiplegia, it is very important to note whether the loss of speech came on at the same time as the hemiplegia, or before it or after it, and especially when there is amaurosis it is very important to make out whether it preceded or followed hemiplegia. It must be kept in mind that the coincidence of the two things, loss of speech and hemiplegia on the *left* side, does not imply that they both depend on disease of the right hemisphere, but more likely that there is disease on each side of the brain. A few months ago I made a *post-mortem* examination on a patient who had hemiplegia on the left side and loss of speech. The patient had been under the care of Dr. Begley in Hanwell, and to this gentleman I am indebted for particulars of the life history of the case. Although I should attach very little importance to the co-existence of these two symptoms when they came on at different times, as they did in this instance, I know that many would insist on such a case being recorded as an exception to the rule, that when speech is lost or is defective the hemiplegia is on the right side. If so, the exception proves the rule, as there was disease to the outer side of the left corpus striatum, and at the junction of the right corpus striatum with the right thalamus opticus. Similarly we cannot conclude, because a patient comes to us with hemiplegia on the right side, with defect of speech and amaurosis, that there is no disease of the right hemisphere as well as of the left. Case XV. shews the importance of investigating the relation of amaurosis to past symptoms most carefully. His case was superficially like that of Case XIV. except that he could talk well enough to give me, with his wife's help, a history to shew that the hemiplegia on the right and the amaurosis were not related. There can, I think, be little doubt but that at the first attack the clot

damaged the right corpus striatum, and thus gave rise to the hemiplegia on the left, and at the same time damaged the adjoining hemisphere, and thus rendered him liable to the amaurosis which followed. The second attack of hemiplegia with loss of speech was certainly due to damage of the left corpus striatum and its neighbouring hemisphere. Yet whilst I thus drew attention to the fact that in this instance the amaurosis did follow disease of the right hemisphere, Case XII., shews that it might have followed the disease on the left side. It may thus be said that the distinction is of no practical importance. It is always important to know as much of our cases as we can, and I have faith that the knowledge we obtain will serve us sometime, although its use may not be at first apparent.

I will now speak of other aspects of cases of hemiplegia with amaurosis, although in doing so I must, I fear, ecapitulate somewhat.

I have not yet made a *post-mortem* examination of a patient who had had neuritis without finding some obvious organic disease within the head, and I think the evidence goes to prove that in most cases this organic disease has existed for some time before it excited those changes, which gave rise to disease of the optic nerves. Now, in Cases like XII. and XV., the hemiplegia is valuable evidence as to the position of such organic disease, and in patients of that age, considering also the suddenness of the paralysis, it is some evidence as to its nature. They each had clearly bad attacks of apoplexy. Now sometimes, when but little of the motor tract is damaged, the hemiplegia may pass off nearly altogether, although of course there remains permanent damage to the brain. The patient, Case XII., got well enough to go to sea again, and had a second attack when he was upon the rigging, yet at the autopsy we found an apoplectic cyst* in his brain, the size of a walnut.

* Page 436 line 2, the word "free" should be "front."

A patient goes to an ophthalmic surgeon for amaurosis; he will very likely say that his defect of sight began in the midst of perfect health, although he may at that very time have the remains of a large clot of blood in his brain, as Case XII. had when he consulted Mr. Hutchinson. Although, as I have said, I should think that every patient who came to me for neuritis only would have some organic disease in his head, I could form no idea either as to the position of that disease nor as to its nature. The position of the disease might be guessed, but I know of no means of making a diagnosis.*

If I found that a patient with neuritis had had hemiplegia some time before, although he might have quite recovered from the paralysis I should think it extremely probable that the neuritis was a secondary symptom of the disease which had produced the hemiplegia. If the patient were a man of middle-age, and above all, if he had albuminuria, I should think that that disease was the result of apoplexy. When a patient ceases to be incapacitated by disease of the brain, he naturally thinks that he is well, and, indeed, he may be well enough for routine work, either of mind or body, when a great deal of the hemisphere is damaged. So far as we can tell, he may, indeed, keep well, but, as in Case XII., he is liable to have headache, neuritis, &c. And when he does suffer, it is clearly not because a certain quantity of nerve-fibres and nerve cells are destroyed, nor is there yet evidence to show that it is because the function of any particular part of the brain is lost. It seems to me that the patient suffers because he has "a foreign body" in his brain. And even this is scarcely a correct expression, as a patient may have a

* In recording Case II., p. 398, I could give no opinion as to the seat of the disease, and I could not form any until the weakness of the left arm came on, and even then I could only make the wide diagnosis of disease of the right hemisphere. Moreover, as the hemiplegia came on gradually and was never quite complete this diagnosis, remembering Mr. Hutchinson's case of tumour of the brain, see footnote to p. 57, could not have been quite certain.

large tumour in his brain, and yet not suffer at all. Strictly speaking, therefore, he does not suffer from the disease in his hemisphere, but is liable to suffer from it. In Case II. there is little doubt that the patient's deceptive recovery was not due to any retrocession of the primary disease, but to his having weathered the storm it had excited in his nervous system with—if I may use such an incoherent simile—only the loss of his sight.

Why one person should have extensive disease of hemisphere without amaurosis, nay, indeed, without any symptoms* of any sort, and why another should suffer; or again, why a person's brain should tolerate disease for a time, and then suffer, I do not know. Of the fact there can be no doubt whatever. Just as a person may have disease in his liver without any liver symptoms, so a person may have disease in his brain without any brain symptoms. Probably a healthy man has more brain than he uses, just as he has more liver or lung than he uses. I had a year ago under my care a patient who had one pleural cavity full of fluid. I told him he was seriously ill, but he did not think so; he "felt well," and went to

* The following is taken from one of our medical journals :—

"*Vast Abscess of the Brain, without Symptoms.*—M. Richet related in the Society of Surgery the case of a youth, aged 18, who applied as an out-patient at the St. Louis, on account of a purulent discharge from the ear. So little inconvenience did he feel from his ailment, that he was with difficulty persuaded to enter the hospital for treatment. With every appearance of excellent general health, he died suddenly next day, immediately after the occurrence of a convulsive paroxysm. At the autopsy the petrous bone was found diseased, but the dura mater covering it had not undergone any change. The cavity of the tympanum was filled with pus, which obtained its discharge both by the meatus and Eustachian tube. All the convolutions of the left hemisphere had become effaced, and a collection of pus occupied the whole of the sphenoidal and occipital lobes, the parietal lobe remaining alone intact. Very small abscesses were scattered throughout the parietal lobe. This patient had never manifested the slightest intellectual disturbance, and no symptom indicated the existence of cerebral lesion, when the pus, bursting into the lateral ventricle, caused instant death."—*Gazette Hebdomadaire*, No. 46.

his work as a drayman. He has been at work ever since, although the fluid has not disappeared even yet. Of course in the cases of amaurosis I relate I can only presume from general evidence that the cerebral disease has been latent. I might cite authorities to prove that in patients who die of other diseases than those of the nervous system, disease of the hemisphere is found *post mortem*. Dr. Rooke, of Greenwich, showed me the brain of a patient who had died of phthisis. There was a large abscess in one hemisphere. About a year ago I saw a *post mortem* at the London Hospital, on a patient who had abscess of the liver, and who had had no cerebral symptoms until the day before he died, when he had a slight convulsive seizure. Yet this patient had two or three large abscesses of some standing in one hemisphere. Of course when I say that disease of the hemisphere need not produce any symptoms, I exclude the motor tract, and—on the left side at least—the convolutions near it. A very small amount of disease of the motor tract would produce paralysis, just as a small amount of disease of the liver, involving the biliary duct, would produce jaundice. If the disease be away from the motor tract or biliary duct, there need be neither, as the case may be, paralysis nor jaundice.

Some at least of the cases show well that of the three symptoms of which I have spoken so much,—headache, vomiting, and amaurosis,—two may have existed for some time before the third came on, so as to actually incapacitate the patient. I have, at page 417, Case VI., alluded to the unfortunate end of cerebral cases, in which the early symptoms of pain in the head and vomiting led to their being called "bilious headaches," and which have been considered unimportant, except for the temporary distress they occasioned. Case XVI., Mr. Hogg's patient, also illustrates this. Of course there is no possible means of being absolutely sure that that patient's right hemisphere had been long diseased; but I think that it is almost certain that it had been diseased since early life. I cannot help thinking that

the disease we found had been an abscess resulting from disease in the ear.—See *Toynbee on Diseases of the Ear.*

In Case XVII, sight did not begin to fail until three months after the disease had begun to excite changes in the patient's brain. She had first severe pain in her head, for which she went to a general hospital; then defect of sight, for which she went to an ophthalmic hospital; and finally, epileptic seizures, for which she consulted me at the Hospital for Epilepsy and Paralysis. And it is very likely that the poor woman will go to some other institution—probably the workhouse—to die. Her case (and the sequel of Case II.) therefore, illustrate what I have written, page 439, on the difficulty of keeping patients under observation when their symptoms change. I have little doubt that my patient has had from first to last but one focus of disease, which has produced all her different symptoms. Mr. Carter, in a note to his translation of Zander on the Ophthalmoscope, says:—"In the out-patient room of the Hospital for the Paralysed and Epileptic, it would at any time be easy to find cases of partial or complete cerebral amaurosis, in which the cerebral symptoms do not by any means force themselves upon the observer." Mr. Carter's observation is quite correct, but an investigation of the history of such cases nearly always reveals other, and often very definite, brain symptoms. I think that the unilateral convulsions—in this case on the left side—point quite as certainly to disease of the opposite hemisphere as hemiplegia would have done. Besides there was a little paralysis following her attacks, in other words, she had epileptic hemiplegia. Case XVI was very much the same in its general features, but here the unilateral convulsions were more violent and more continuous, and therefore the epileptic hemiplegia was more decided. I have as little doubt that there is, in Case XVII, disease of the right hemisphere in the region of the right middle cerebral artery, as I had that there was in Case XVI. I have now under my care also a patient, Case XVIII, in whom it is certain that the hemi-

sphere is diseased. He has both partial paralysis and epileptiform seizures. In his case the paralysis is not due to the violence of the convulsions but the spasm begins in muscles that are already partially paralysed.

CASE XIV.—*Hemiplegia on the right side with loss of speech—Amaurosis—History of former Cerebral symptoms.*

Hannah W——, age 30 (?), was brought to the London Hospital hemiplegic on the right side, and unable to utter anything but "yes" and "no," and those words at first she used without precision. When asked to tell us where she lived, we thought she made abortive efforts do so as she moved her lips, but she uttered nothing. The patient had been paralysed two days, but how it came on we could not get to know. She was, all the time she was in the hospital, quite sensible; and except for her paralysis and loss of speech, she seemed very healthy. She could put out her tongue readily, and could eat and swallow well. There was never any albumen in the urine; there was no evidence present of syphilis, but from her associations she may very likely have had it.

Her pupils were not affected; they were neither too large nor too small. On using the ophthalmoscope, I found in the left eye, "The margin of the optic disc, especially the apparent outer margin, is indistinct and gradually smoothes off into the neighbouring fundus. The inner margin is also indistinct, but looks more ragged than smooth. The arteries are not apparently much diminished in size. The changes in the right eye are nearly the same."

The nurse of the ward remembered that this patient had been in the hospital about a year before for "fits," but remembered nothing more.

Two days later the patient tried to tell her age by her fingers, and this I several times afterwards asked her to do. It was nearly always about 30. When she wanted anything she could, the nurse believed, beckon for it. On April 11, she could say the word "better." This, and "yes" and "no," were the only words she could say. She could not say "betty" nor "batter," nor any other substitution—compound of the word. In trying to say

"betty," she said "bet" well; and although she seemed to make great efforts to produce "ty" as the next syllable, "ter" was always produced instead. Then she smiled and shook her head, as people do who are half amused and half vexed at failing in a little thing.

April 16. She had a convulsive attack. She was, it was said by the nurse, convulsed on both sides. She bit her tongue. She seemed, afterwards, to go on in pretty much the same condition.

May 30. Can say "yes," "no," "better," "bread," "pan," "net," and she made Dr. Parker understand "Monday." I urged her to say "Tuesday," she said "Bet-day;" "Wednesday," "Wetsday." It may be said that this was owing to defect of articulation. Very likely; but not to a difficulty of articulation, due to actual paralysis of the muscles of articulation. It is at least a mistake to suppose that in cases of this kind there is any precise order as regards linguals, dentals, &c. When asked to say "rub," she made a sound most like the attempt to pronounce "pf;" "egg," "et" and "ext;" "head," "et;" "end," "edta."

She did not improve in paralysis, but her power to make signs became gradually greater. On June 19, when asked how many days there were in the week, she said "stels," then held up six fingers and then seven.

This patient seemed to see well. Probably if she had learned to read, which is not likely in one of her class, she would have lost the power even of reading to herself, and of course she could not read aloud. The only way of getting any trustworthy information was by looking into her eyes.

Into the nature of the defect of speech I need not enter here. The "general faculty of language" was never probably quite lost. We meet with all degrees of defective power of expression, but in nearly every case there is the same great clinical association viz., hemiplegia on the right side. To this rule, I have myself seen but few exceptions; and I have never seen so great defect of speech, as this patient had, with hemiplegia on the left.

CASE XV.—*Amaurosis after Hemiplegia on the left—Defect of Speech with Hemiplegia on the right.*

I was consulted at the Hospital for Epilepsy and Paralysis by a patient who had defect of speech and paralysis on the right side. He was also amaurotic. The defect of speech came on three months before suddenly, and was no doubt due to disease of the left hemisphere near to and involving the left corpus striatum, for he was paralysed on the right side. His speech was only partially affected, and apparently it was only a certain difficulty of articulation which I have called "Ataxy of Articulation" (See remarks with Case XIV), and which I have found to be due to disease near to and involving the corpus striatum, and to be associated with difficulties of other acquired methods of expression, as in spelling, &c. The attack which produced such symptoms in a man 40 years of age, was doubtless due to apoplexy; and the fact I have here to mention, that he was insensible and "deranged" for three weeks after, points to a large clot.

He had atrophy of the optic nerves; the edge of the discs being indistinct, and the vessels small. I was interested to hear the patient's wife say that the defect of sight followed an attack of hemiplegia the patient had had five years before, and that attack had been on the left side.

The case excited great interest, but the patient only came once or twice; and I unfortunately knew nothing further of him than that he died, but in what way I could not learn.

CASE XVI.—*Pain in the Head and discharge from the Ear from Childhood — Epileptiform attacks with Epileptic Hemiplegia — Double Amaurosis—Autopsy.*

For the opportunity of seeing and of being present at the post-mortem on this case, I am indebted to Mr. Jabez Hogg. The following notes are from joint contributions by Mr. Hogg, Mr. Calthorpe, and by myself.

The following is by Mr. Hogg:—

A. B. H., æt. 34, public singer, admitted June 8th, 1863, with loss of sight in left eye and partial strabismus and diplopia.

He complained of having suffered from headache for some days, arising, as he thought, from over-work, having at the time to sing at three different public rooms every night. He was well known as an excellent comic singer, and was remarkable for the great energy he threw into the various characters. He described the first attack as coming on after having made greater exertion than usual, when he rushed off the stage into his dressing-room, and there remained, he believes, for a short time partially unconscious; but this could not have been for very long, for, after the administration of some stimulants, he recovered sufficiently to fulfil another engagement at some distance, but this only served to increase his languor and the pain in his head. The next day he saw his medical man, who prescribed for him, and assured him that it would all pass off. In a day or two he was no better, and it was then that he found the sight of his left eye so much impaired that he came at once to me.

There was a peculiar prominence of both eyes, producing a somewhat vacant stare. He complained of slight headache, but was otherwise quite well, and able to take his food with an appetite. The diplopia annoyed him very much and he walked with an unsteady, uncertain gait. He could scarcely tell me whether he had sight in his left eye, and upon testing him I found he could just distinguish daylight. The right was not very much better, but with it he could read large print, but not the letters on the houses on the opposite side of the street. The pupils were nearly fully dilated.

[When I some time afterwards examined the optic discs, they were in the condition of atrophy, as I thought after neuritis. I have no notes of the examination. It was afterwards ascertained from his wife that the attack described by Mr. Hogg was not the first. One day, shortly before he was going to wash himself preparatory to going out to sing, he said, "Tim, I feel so giddy, I have got such a strange sensation, I can't see, and I can't recollect anything." He had a trembling—not an attack of shivering—but did not become insensible. In a quarter of an hour he dressed himself, and was going out to sing, when, at the door, "he felt and fumbled about." He then went to bed and was sick, but he had no convulsive attack—J. H. J.]

He was treated; but on July 7th he left the hospital not in the least relieved, the sight, if anything, worse than it was before.

He continued an out-patient for some time, but at last became totally blind.

October, 12, 1863. His wife came to me begging I would go and see him at his lodging in the Borough. I did so, and found him in an epileptic fit; the left leg and arm paralysed (hemiplegia); but the moment the fit subsided he recognised my voice. I prescribed for him, and subsequently saw him many times. The fits gradually subsided, but he remained very feeble, and with the left side partially paralysed. He, however, recovered, and had no return of the fits for some time, during which I recommended him to place himself under the care of Dr. Hughlings Jackson, at the hospital in Queen Square.

The following is by Dr. Jackson:—

I saw the patient in November, 1863. He had then had another fit, and had slight hemiplegia on the left side.

January 17, 1864. I was asked to see him at home. I was told that he had had twenty-five fits that day. I was told also that they affected both sides, but in two that I saw the left arm and leg and both sides of the trunk were affected. Both eyes were turned to the left, the pupils were quite equal and did not alter in size during, before or after a fit. After each of these fits he vomited a quantity of dirty green fluid, and had done so once before. When the convulsions passed off he never became fairly conscious, but moaned. He put up his right hand to his face, but never moved the left spontaneously. When it was pinched, however, he moved it slightly and moaned more loudly.

I did not see much more of him at this period, as he was then under the care of Mr. Woolley, who took charge of the case.

Next come two notes by Mr. Hogg:—

April 27, 1864. I saw H. who had been entirely free from fits and had once sung for a benefit.

March, 1865. H. called to see me, looking remarkably well, and telling me he had had no return of fits since I saw him in April, 1864. N.B.—Not the smallest change in sight.

Soon after this note the patient began to be ill again.

For the following interesting notes I am indebted to Mr. Calthorpe:—

About May last I first saw Mr. H. He was then suffering from a series of epileptic fits, of the same character as those he had experienced before. He had had, I believe, when I first saw him.

about 100 fits, chiefly at intervals of a quarter of an hour. I did not see him actually in a fit, but was informed, that during the intervals he was possessed of all his faculties (save sight), and only complained of slight pain in his head. There was no paralysis or loss of sensation, and but very slight ptosis of the left eyelid. The whole number of fits in this attack was about 250.

Within the last two or three months he had two other slighter attacks; in each of which he had forty or fifty fits. But as his friends did not send for assistance, I have no notes whatever of the seizures. I was told though, that they differed in no way from the previous ones.

On the 7th of October, 1865, I attended again for Mr. Hogg. He had had nearly 200 fits since the Friday (the 6th October) previous. I saw him in a fit, which commenced with a rather hurried inspiration, followed by a rapid rolling of the eyes (widely opened) from side to side; then ensued violent convulsions, principally affecting the left arm and especially the hand. The fit lasted, as usual, about a minute, and the instant the convulsions were over, he was sensible of external objects, and replied readily and aptly to any question put to him. When asked where he felt most pain, he raised his right hand and put it over his right temple. The left side of the face looked paralysed; there was slight ptosis, and the left leg could be but slightly moved.

On Monday, the 9th, I saw him again: the number of fits had increased to nearly 450. I saw him in two fits. They were accompanied by more determined ptosis of the left eyelid, though still not to any great extent. The left arm was partially paralysed. If lifted, it fell with a bang, but could be shifted, by a seemingly great though voluntary effort, to a more comfortable position. The left leg was completely motionless. He was still perfectly sensible between the fits, but evidently fast sinking; indeed I was told that the last twenty or thirty fits had not been so powerful as usual. The pulse was small and slow. He had about fifty more fits during the night, making in all nearly 500, and he died on Tuesday morning, about 5·0 a.m. The fits ceased about two hours before death, and he died perfectly quietly, so much so, indeed, that the exact moment of death was not noticed. The duration of the last attack was about ninety-six hours.

It is somewhat curious that on the Thursday night he went to bed, saying that he felt better than he had done for a long time.

previously, and his wife was awoke some time during the night by his being suddenly taken with a fit.

The following is by Dr. Jackson :—

The autopsy was made by Mr. Calthorpe Mr. Travers, and myself. It was quite certain that we should find disease of the right hemisphere. On removing the calvaria, the convolutions at the side of the hinder part of the anterior lobe on the right side seemed to be atrophied, and there was here more fluid than on the other side, and the brain seemed shrunken. On further examination, it was not easy to make out the exact number of convolutions affected. Indeed, on making a section, several of them seemed to be little more than bags of semi-fluid matter. On comparing it with a wood-cut from Dr. Arbutin's work—"Considérations sur les Localisations Cérébrales et Particulier sur le Siége de la Faculté du Langage Articulé, 1863."—I made out that the disease was chiefly in front of the furrow of Rolando, and that it affected at least the hinder two-thirds of the 3rd and 2nd frontal convolutions. The brain here was nearly fluid, and soon gave way into a cavity which extended inwards and involved the corpus striatum slightly. There was another such cavity in the hemisphere just above the ventricle and near the superior longitudinal fissure. The rest of the brain was healthy. By the microscope I could find nothing except fat-globules and granules.

I have to regret that I did not ask Mr. Calthorpe to examine the left petrous bone. I had forgotten then that the patient's wife had known that for thirteen years he had had an offensive discharge from the left ear, and his mother had said this had existed from childhood.

Now, it seems, too, that he had always "suffered from his head," even from childhood. His wife said that before the events recorded (*i.e.*, before 1863) he used to be liable to be laid up with "nothing but pain in the head," and that he used then to vomit. The vomit was sometimes clear, and sometimes yellow. The doctors used to treat him for it with iodide of potassium. The pain was said to be neuralgic, but it had never affected his face. It was all over his head.

CASE XVII.—*Headache, Amaurosis, Epileptiform attacks and Epileptic Hemiplegia.*

Sarah S., æt. 21, a well-built, good-looking woman, came to me for epilepsy at the Hospital for Epilepsy and Paralysis, April, 1863. She was then also quite blind. The following was her history:—

Twelve months before I saw her, in the early part of 1862, she began to suffer from severe pain in the head. She had had one child twelve months before, but it died. She had not been regular for some time before the pain began. The pain passed from temple to temple, and was all in front of the ear. She never had any pain at the back of the head. It was slight at first, and then became very bad. It rarely went off, only just when she dozed at night, but she got no continuous sleep. It was bad for three months, and then ceased, but when it had ceased her sight began to fail. At first it failed at night only; she could walk well in the day, but could not at night. "There seemed to be fog before the eyes." The left eye failed before the other. In one month sight was quite lost, and she has been blind ever since. It is worthy of remark, that she had no vomiting at any stage of her illness.

Nearly four months before I saw her, *i.e.*, eight months from the first, she began to suffer from the fits for which she consulted me. She was then, she said, except for the blindness, in perfect health, and she has always been so since she has been under my care.

One day, when swallowing a piece of apple, she felt "something jaw-locking her," and her mouth was drawn to the left side. She then fell back, and her left arm and leg were convulsed. She was sensible throughout, and has been in most of the others. She bites her tongue, and generally on the right (*sic*) side. She can talk after the fit, but usually sleeps, but only for a few minutes. Next day she feels ill, and has a headache. Since the first, she has always known that the fits are coming on by a feeling of "numbness" in the left arm and leg, left side of the face, and left side of the tongue. She has pain in the arm and leg, and the hand "draws up" and "claws." I never saw her in a fit, but one day I saw her at the onset of one.

I saw that the whole left side of the face was twitched (orbicularis palpebrarum included), but being urgently required in another part of the hospital, I could not wait to see the rest.

When I see her at the hospital she looks perfectly healthy, except that she is blind; but she has once or twice complained of feeling weak on the left side after the fits. On one occasion she said she lost the use of the left arm and leg for a quarter of an hour; slight epileptic hemiplegia. Once too, but once only, she said that she had pain, a "nasty numbing feeling" up the right arm. Recently also, as is common in epilepsy, she has had occasional spasm in part only of the muscles usually affected in the fits, viz., in the left arm.

She has had two or three fits in a week, *i.e.*, about eight before she saw me.

Practically, she is quite blind, but can just perceive the light dimly with the right eye. The discs are quite white and look flat, their margins are indistinct, and round about them the fundus is darker, as if irregularly pigmented. Here and there on each side is, as it were, a process or stream of this colour running out into the healthy fundus, the rest of which is normal. The vessels do not seem to be much diminished in size. The pupils are large. There is no exophthalmos.

Her sense, of smell and hearing are quite good, and her speech is perfect in every sense. She seems to be very intelligent. In short, the whole of her physiological symptoms are double amaurosis and hemiplegic left epilepsy. The hemiplegia points to disease of the right side of the brain affecting—probably secondarily—the motor tract; but what that disease is there is no evidence to show.

### Case XVIII.—*Extensive injury to the right hemisphere—Double amaurosis—Hemiplegia, and epileptiform attacks.*

This patient was under Mr. Paget's care in St. Bartholomew's Hospital. He permitted me to see the patient, and was good enough to allow me to take him under my care for epileptiform attacks. I need scarcely point out that this is another case which is full of points of interest. In the first place, it seems likely, as I believe Mr. Paget thought, that the case had been one of cerebral abscess. Then the great intelligence of the patient is a point

worthy of great attention. He speaks quite well, and has written me a clear and able account of his case. It is interesting, too, as a case of paralysis with epileptiform convulsions. Again, there is an aura, *i.e.*, the convulsion begins very locally, in the hand, and this can be stopped by the ligature. It may seem remarkable that a ligature should stop the fit, when clearly the disease is organic, but it is, I think, frequently so in epileptiform seizures from disease of the hemisphere. Then this patient has partial fits, as he calls them. This case resembles Case XX.* in the physiological symptoms. In both, the same part of the brain is, I believe, damaged; although, in one, from an injury, in another by syphilitic disease of the connective tissue. It is the same region as was affected in Cases XIII., XVIII., and XIX. That the fits are kept off by the bromide of potassium is a point of extreme interest, not only as regards the empirical fact, but as showing that in epilepsy we have not only to treat the original local disease, which produces the epilepsy, but some secondary condition to which the local disease gives rise.

A man, now 23 years of age, was struck on the head, Dec. 3, 1863, by a shovel. The immediate result was a scalp wound, for which he was kept in a hospital in New York fourteen days, and was then discharged apparently well. A week later he began to be giddy, rambled about, and talked nonsense, and was supposed to be going out of his mind. His head swelled, and he was told at the hospital that he had a "puffy tumour" on the right side of his head. He became comatose; and on January 3 was trephined. He was afterwards told that this was done on the supposition that there was an abscess "pressing on the brain," and that at the operation "four or five ounces of matter were let out." He did not recover his senses, he says, until March 4th.

[Here, out of order, I may state to have done with the description of the organic disease, that there is now wanting a large tract of bone on the right side of the skull (4in. by 4), part of the frontal, part of the occipital, and nearly all the parietal bone.]

The first fit, or at least the first of which he knows anything, occurred on March 14th—101 days after the injury, 80 days after the trephining, and 10 days after recovering consciousness.

* This case will be related in the next number of this Journal.

The fit began in the fingers of the left hand, and it gradually ran up the arm, missed the neck, and affected the face. The face was drawn. After this he became insensible, and found, on recovery, that he had bitten his tongue on the left side. He was told that the fit only lasted two minutes; he did not sleep after it, and in half an hour felt well, except that the left arm and leg were weak, and they have been so ever since. He had in fourteen days a series of five fits, and for some time four or five at a time, about every fourteen days. At the end of about five such periods, he had no more until an operation on August 20. The bone came away on August 3, and on the 20th an unsuccessful attempt was made to bring the skin over the gap. He then had three fits. Since they have been much less frequent.

They all begin in the same way, viz., in the hand. The arm is now decidedly paralysed, so that he cannot use it for any purpose. The leg is weaker than the other, but only slightly so.

This patient has atrophy of each optic disc; but they are now pretty well margined, but there is a slight irregularity at their edge, which makes me conclude that the condition of atrophy has followed neuritis. It is the condition into which neuritis ultimately passes. The vessels are not very much diminished in size. There is no loss of smell, and the patient is very intelligent. So long as he takes the bromide so long is he free from fits.

Case XIX.—*Hemiplegia on the left side with Amaurosis—Autopsy.*

Thos. R——, age 50, came under my care in July last. He was transferred to me by my colleague, Dr. Parker.

The patient had been hemiplegic on the left side three months. It was believed to have begun suddenly, but he was never able to give a clear account of it, and his wife, when she came to the hospital, was not in a condition to be relied on. The patient lay in bed, and was never fairly alert, but was not actually insensible until shortly before his death. He could always talk properly; and on Sept. 4, he said his sight was bad. Mr. F. M. Mackenzie, Dr. Woodman, and myself examined the eyes, and found that he had optic neuritis on each side. He used

to have great pain in his head, and this was his chief complaint; but he had not had any vomiting.

He died Oct. 26. The right hemisphere bulged laterally and on slicing it, the knife went through a dirty yellow diseased mass which was just under the thinned grey matter of the convolutions. This was nearly on a level with the lateral ventricle. The corpus striatum seemed to be intact in its ventricular portion, but on cutting through it, it was found to be involved in the mass. The mass was about the size of four walnuts, and extended up to and so as to render prominent the grey matter of several convolutions which were soft. These included the hinder part of the third right frontal. The convolutions of the island of Reil were hardened and looked corrugated.

The mass was of a dirty yellow colour, and was made up of nothing whatever but granules. There was no fibre, and there were no blood crystals. This was the only part of the body diseased.

*Sequel to Case II, p.* 398.

This boy is dead. He was eight years old. As my last paper was passing through the press the boy had begun to get worse again, and on April 3rd I made a note to that effect. Shortly before that date his friends had considered him well, except for his blindness, and of the extent of it they were not fully aware until Dr. Septimus Swyer and myself pointed it out to them.

The boy gradually grew worse, the pain becoming more and more severe, and the vomiting returning.

I saw him only at intervals. On July 20th I have a note that he complained that the pain was chiefly intense in the right ear. On the 15th of August I saw him again. He was then dull and drowsy, and yet, although peevish, not obviously unintelligent. For three weeks he had weakness of the left arm. He could move it, but with much tremor, and it was of but little use. As he was lying in bed, and was disinclined to be disturbed, it was not easy to demonstrate that the leg was weak, but doubtless it was so. There was now also swelling of the side of the head and face, pretty much as there was at the autopsy. He died Nov. 5th.

Post-mortem examination by Dr. Swyer, Dr. Septimus Swyer, and Dr. Hughlings Jackson.

Nov. 8, 1865. The right side of the head was more rounded

at its fore part than the left. This was chiefly due to swelling in the temporal region. The swelling extended to the region of the right superior maxillary bone and thence to the inferior maxillary. Both these bones were believed to be involved, but we were not permitted to examine them as much as was desirable. On looking into the mouth we saw a ragged dirty-looking tumour growing from the right side of the fore part of the palate.

On sawing off the skull-cap, the sensation was like that felt on sawing off the skull-cap of a much younger child. The saw-cut in the right temporal region was soon filled with a dirty bluish-coloured matter. The skull-cap came off easily. It was thinner than usual, although the cranial cavity had not much enlarged. The brain was everywhere easily detached from its bed, except at the side of the sella turcica, and at the inner end and front aspect of the petrous bone. From these parts the brain was cut away, and pieces of the tumour adhered to them.

It was then seen, that so far as the base of the skull was concerned, the disease was limited to the middle fossa. This was perforated, and through the hole the finger could be easily passed into the mouth, the channel being through the tumour seen in the mouth.

The disease of the brain was a tumour, involving the middle lobe. A great part of the lobe was in a sloughy condition.

No doubt had been felt by any of us for some time before death that the disease was malignant. The autopsy showed that it was. The tumour (at least the part of it adherent to the bone) was soft, and exuded much juice on scraping.

We found also secondary deposits in the lungs. At first the feel of the lungs made us think of miliary tubercle, but they were too soft. Then there were larger masses on the surface, which looked cartilaginous, but these, like the smaller ones, were soft, and yielded much juice on scraping.

The tumour from the brain, and the large and small masses in the lungs, showed many nucleated oval cells (or nuclei), all of them containing one, and some two, or more nuclei (or nucleoli). The juice scraped from any of those parts showed crowds of such cells or nuclei.

Probably the tumour began in the bone or the membranes, but this is by no means certain.

(To be Continued).

## A LECTURE ON POSTERIOR STAPHYLOMA, WITH SPECIAL REFERENCE TO TWO SINGULAR CASES.

(*Moorfields, June 2nd*, 1865.)

By J. F. Streatfeild.

In the last edition of our most comprehensive English work on eye diseases, published in 1854, we read of staphyloma posticum, that it "has been met with on dissection," and nothing more is said of it. That there was such a disease, or, even more, that it produced such results as are now well understood by posterior staphyloma, was hardly known before the invention of the ophthalmoscope. The title is not a very good one. Posterior staphyloma (or "sclerectasia posterior") is rather a name for the effects of disease than for the disease itself; but, until we know more of the mode or modes of production of posterior staphyloma, it is convenient, and, I think, speaking generally, it is better than the alternative of "sclerotico choroiditis posterior," which may or may not have existed, certainly does not always exist, in cases such as those of which I am about to speak. But then, again, in posterior staphyloma, so called, it must not be understood that there is always a staphylomatous part that is so only, or even particularly, to the extent of the disease, as it is seen with the ophthalmoscope, but *there may be only a general staphylomatous extension of the coats of the eye posteriorly.* Posterior staphyloma might be described in different ways of classification, but I propose to consider it under two heads—the stationary and the progressive staphylomata. From whichever kind the patient suffers he probably comes to you complaining of myopia. In the latter form he probably complains of increasing myopia, and other and more serious complications may exist, or will be likely to arise. In the stationary kind of posterior staphyloma the great characteristic of an ophthalmoscopic examination is a white crescentic mark touch-

ing the optic nerve entrance, and embracing it more or less, that is to say, its concavity corresponds with and is joined to some part of the circumference of the optic nerve entrance. Not unfrequently, however, it is not thus partial in its extent in relation to the optic nerve. The horns of the crescent may encircle the nerve altogether. If this white mark completely surrounds the nerve it is not equally broad, but, as in the case of the simple crescent, its greatest breadth is towards the posterior pole of the eye, that is to say, to the *outer* side of the nerve. Sometimes it is below the optic nerve entrance, and but very rarely in other positions. Liebreich says "I have never seen it above" the optic nerve entrance, but in our last course of ophthalmoscopic demonstrations we have seen a case in which there was a small crescent in that position. Some of you will, no doubt, recollect the case. The outer margin of the crescentic mark generally forms a tolerably regular curve, and when it extends nearly or quite around the optic nerve entrance it might be described as a part of the circumference of a circle, somewhat larger than the optic nerve entrance, and of which the centre is to one side (generally external) to that of the nerve. The convexity of the crescentic mark is generally more or less bounded by streaks or by a continuous line of brown pigment. Beyond the dark margin is the normally bright red choroid, with its epithelium, etc., all apparently unchanged, and the contrast between this and the white of that portion of the fundus to which the disease appears to have been limited is very striking, especially as it is of a peculiarly glistening white, and the limits of the two are defined by the dark pigment of which I have spoken.

But in the progressive form of posterior staphyloma the choroid in the neighbourhood of the white mark generally is paler than elsewhere, or it is so in parts, and the colour may be abruptly margined in gradations, or it may be shaded off from the staphylomatous part, or, more accurately, I should say, from the white space. The limits of

the white space become irregular, and instead of one even curve, its outline is of several bows jutting out, with angles towards the optic nerve entrance. The retinal vessels crossing the staphyloma take a straight course, as if stretched, and, by contrast with the light back-ground, they appear very conspicuously. In some cases irregular patches of choroidal pigment are seen in the white space and in the thinned parts in the neighbourhood of it which are threatened by its advance, and generally the optic nerve entrance appears oval, or flattened on the side towards the staphyloma. This is because the optic nerve entrance, or a part of it, has been drawn to one side and backwards in the bulging of the sclerotic, so that the disc is seen in profile, or partly so; and here it is worth while to observe that the long diameter of this oval is at right angles to the direction of the greatest extent of the staphyloma.

Cases of posterior staphyloma are very easy of ophthalmoscopic examination; indeed all cases are so in which the fundus is easily lit up, the media being clear, and in posterior staphyloma there is an abnormal proportion of light reflecting surface in the back-ground of the eye. The eyes of fair complexioned people, and all those in which the choroid is paler, having less pigment than usual, are, for this reason, most easily examined.

To those who are unused to ophthalmoscopic examination it may be useful here to point out to you the differences that may be observed between posterior staphyloma and some of the other cases of ophthalmoscopic disease. Among the cases which I have known to be mistaken for posterior staphyloma are those of results of inflammation of the optic nerve, or the "white atrophy," of which we see so many examples. But in these cases the white optic nerve entrance is not larger than the usual healthy optic nerve entrance, but probably smaller, whereas posterior staphyloma is an addition to the size of the optic nerve entrance, and the staphyloma (including the optic

nerve entrance) considered as a light spot in the red choroid of the fundus, is more or less larger than the usual size of the optic nerve entrance, as the staphyloma is larger. Then, in a case of posterior staphyloma, the optic nerve entrance is to be seen as a pinkish round or oval spot in the white space. It can be found at once by observing the part to and from which the retinal vessels go. Also, in posterior staphyloma, the arteries and veins are normal in size, and relative proportions, and are very distinctly seen, all of which is contrary to that which is generally seen in a case of "white atrophy." In glaucoma there is a whitish margin to the optic nerve entrance, but it is dull as compared with posterior staphyloma, and there is no one part at which it is much wider than another. Then, in glaucoma, there is the visible pulsation of the vessels of the optic nerve entrance, and they are bent in their course over its margin, instead of being very straight, as in crossing the staphyloma. In glaucoma, too, the patient has been getting more and more far-sighted, instead of short-sighted, as I have said of posterior staphyloma. Besides the ophthalmoscopic distinctions there are many well known means of diagnosis of glaucoma, into an account of which I need not now enter. Glaucoma may be superadded to posterior staphyloma. Glaucoma or "white atrophy," especially the latter, could hardly be mistaken for any but the stationary form of posterior staphyloma. But some cases of inflammatory effusions and changes in or near the optic nerve entrance more resemble the larger posterior staphylomata. If of the choroid, it is probably less exactly applied to the optic nerve entrance than posterior staphyloma is, and it is not so glistening in appearance. If of the retina, around the optic nerve entrance, as in some cases of Bright's disease, there is an indistinctness or a complete obliteration of the outline of the optic nerve entrance, whereas in posterior staphyloma the optic nerve entrance is easily distinguished in or by the side of the white space. Moreover, in these cases there is not the

same tendency to form definite outlines of arches outwards from the optic nerve entrance. In these retinal cases also there is not the same brilliancy of reflexion that characterizes a posterior staphyloma. And it is to be remembered that if the light coloured space, which is identified with posterior staphyloma, is not always quite white, it is very bright looking, never of a woolly white or of a "dead" colour. If, in eyes otherwise diseased or in old people, the media are not clear and colourless, the fundus, and especially the white exposed sclerotic has often a more or less yellow tint.

The disease is called "sclerotico-choroiditis" or "staphyloma," the result of the former; but, besides some slight hyperemia in parts of the choroid near the optic nerve entrance or the white space already existing, or in the thinned parts, which is sometimes to be noticed, we see very little appearance of inflammation, on an ophthalmoscopic examination. In some cases of stationary staphyloma there is no appearance of localized bulging of the coats of the eye, but in some of the advanced cases it is very evident. The retinal vessels crossing the staphyloma appear to be stretched, or on a different level to those of other parts of the retina. And the optic nerve entrance is apparently oval, or drawn away to the white or light coloured space, where it is most extensive. Besides, it has been found, in these cases, *on dissection*, to be bulging or staphylomatous. The choroid and retina recede with the sclerotic. The choroid becomes stretched and then atrophied. The retina is so also, or it may even become detached from the choroid. The choroid being atrophied, its vessels obliterated, and its pigment gone or heaped up irregularly in some places, the white sclerotic is exposed, and reflects the light brilliantly—"the white of the eye," it is in fact. Perhaps in slight cases of posterior staphyloma the choroid is at first only separated from the margin of the entrance of the optic nerve to some extent of its circumference; but in other cases we see the choroid gradually

disappearing altogether, thinning progressively around the optic nerve entrance, and from it especially towards the posterior pole of the eye, so that the yellow spot is likely to become involved in all cases. The inflammation is localised in that part of the eye upon which, especially if there is an intraocular hypersecretion, pressure would be likely to take effect, and if it is principally and in the first place a sclerotic affection, that there is so little evidence of it ophthalmoscopically, may be explained by its being then covered by the choroid coat, which becomes stretched and atrophied when the sclerotic is first weakened by the inflammation, and then bulged outwards.

That the antero-posterior axis of the eye becomes thus lengthened will of course account for the myopia.

Sometimes posterior staphyloma seems to be a congenital affection. I have now a little boy attending the hospital, who was first brought to me as an infant for this disease. His eyes are always rolling laterally.

In advanced cases, besides the myopia as a result of the advancing disease, the patients become more and more amblyopic, as in one of the cases I am about to relate to you.

The cases are two; both were attending our last evening course, and I have made careful drawings of both cases, which I have brought to show you. Both are instances of the progressive form of the disease, and both of them are in some respects very remarkable, hardly alluded to in any of our books describing ophthalmoscopic diseases, and not figured in any of them. The cases are also quite different.

The first is—

Cornelius Cronin, who came to me here on the 6th of February, in the present year. He came from Cork, where he had been educated for a schoolmaster. For eight or nine years, he says, he had studied. He was very fond of it, and had "strained" his eyes. He had learnt several books of Euclid, as he informed me. For some years past his imperfect vision had obliged him to work as a labourer,

and, seeking work, he had come to London. He had evidently read more than most labouring men, and was much better educated in every way than they generally are. He told me he had "no permanent residence, but had been recently dwelling in St. Giles!" He had never sought any advice, but his sight being so very defective, and because he squinted, his friends sent him here. He was 25 years of age, slight and fair, in good health. His parents were not short-sighted, nor had they any defects of vision, but they had not had the education he had had. When he was 14 years old his sight began to fail, and to get shorter and shorter. In three or four years afterwards he had to give up reading and writing. The external strabismus of the right eye began about this time; it was of about three lines when I measured its extent. Since that time his sight has been gradually getting worse and worse. With the right eye he could hardly spell No. 16 of Jäger's types, at any distance or in any direction. With the other he could, at six inches distance at farthest, read No. 1 fluently. So that I suppose he meant by his failing sight that it was so gradually in the right eye tested separately, and that with the left eye he could only, as at present, see objects brought nearer and nearer to the eye. As a boy he had kept sheep, and he could make them out at a distance like any one else. He had sometimes seen muscæ, like strings of pearls, when looking at a light. He had seen no flashes of light; he had felt no pain or any sensation of tension in the eyes, no confusion or distortion of objects. He had never worn glasses. He had never had inflamed eyes, or received a blow on either eye. At some times his lids used to be agglutinated in the morning. His general health was very good, and he had had no illness. But he complained that if he stretched himself, that is, if he extended his arms over his head, a mist used to appear before him for an instant, and that when he looked down and then up at the light he saw something like gauze descend from above and his left, to below and to his right side (over the

left eye). In order to see best, he used to shut the right eye altogether and the left partially. There was a constant tremulous motion of the right eye laterally, bringing it each time a little way inwards. The movements were not quite regular; they were about 50 in the minute. The tension of either eye was normal, certainly not abnormally great. The length of either eye from before backwards seemed to be very great when converged.

When I examined his eyes with the ophthalmoscope I at once saw the appearances depicted in the plate. The singularity of the case is summed up in this—*a posterior staphyloma existed without any connection with the optic nerve entrance.* An ordinary posterior staphyloma existed in this eye, the right, but chiefly on the inner side of the optic nerve entrance, away from the extraordinary staphyloma which was quite separate and altogether unconnected with it. This the ordinary staphyloma was not therefore in the most usual situation, or rather, as it extended round the whole circumference of the optic nerve entrance, it should be said that the crescent, the widest part of the staphyloma was rather, but not exactly, on the opposite side of the optic nerve entrance to that on which it is usually found. As far as the ordinary staphyloma was concerned, the left eye of the patient was symmetrically affected, but there was no other resemblance between the two eyes, and no initial stage of the extraordinary staphyloma, that could be recognized, in the left eye. The larger and extraordinary staphyloma of the right eye was of about twice the diameter of that encircling the optic nerve entrance. It occupied the region of the yellow spot. It reflected light very brilliantly as from the bottom of a hollow, from one part or another particularly as the light was thrown into it. Its margin was surrounded by irregular streaks of black pigment, some of them being within the margin, as if it had increased in size, and they had been left there. Its margin fell a little out of the circle on the side towards the optic nerve entrance, as if it would be likely to join with the

Inverted image_Right Eye.

Plate. I.

J. Erxleben, lith.

J.F. Streatfeild, del

Hanhart, Imp.t

staphyloma in that situation; but there was a broad bridge of perfectly healthy looking choroid, retina, &c., between the two staphylomata. Many of the short ciliary arteries were seen entering the large staphyloma, through the sclerotic, generally in pairs, through little slit-shaped openings common to the two. Some of them seemed to me to go to the sclerotic itself. Their course seemed also to indicate the deep hollow of the staphyloma. They were very fine, and did not seem to have a forward course, but were generally curved into the staphyloma. The choroidal epithelium in the neighbourhood of the large posterior staphyloma was all around it much more distinctly pigmented than elsewhere, and on the inner side of the optic nerve entrance the choroidal vessels could be very distinctly seen.

[To be continued.]

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## EXPLANATION OF PLATE.

The coloured plate shows the inverted image of the right eye of Cornelius Cronin, and exhibits a large ordinary staphyloma surrounding the optic nerve, and a large, almost circular, extraordinary one occupying the position of the yellow spot. The details are sufficiently described at page 86.

## THREE CASES OF CANCER WITHIN THE EYE-BALL IN WHICH SYMPTOMS OF ACUTE GLAUCOMA WERE SUDDENLY DEVELOPED.

By Jonathan Hutchinson, F.R.C.S.

The three cases which I am about to relate illustrate some important points in the pathology and diagnosis, both of detached retina and of glaucoma. Two of them also convey an important practical hint.

Case I.—About four years ago a woman, aged 45, came to the Hospital in the third day of what appeared to be acute glaucoma. The pain in her eye had set in rather suddenly, and it had been most severe. Her sight had been failing for several months. She had had photopsiæ muscæ, &c., but there had been no pain until the present attack. The globe was dusky and congested. The cornea was steamy, and the media returned a dull, reddish appearance, as if stained with blood. The tension of the globe was much increased; and in the belief that I had to do with a case of acute glaucoma, I advised an immediate iridectomy. This was done, and great relief to the pain was afforded. She, however, regained no sight, and the eye a month or two later again became very irritable. As the media were still opaque, and the organ clearly lost, I now advised extirpation. She did not submit to this operation till some weeks later. After its performance I found a growth of melanosis between the choroid and retina, close to the optic nerve. It had perforated the sclerotic, and a small growth, the size of half a hazel nut, bulged into the cellular tissue of the orbit. After the operation all went on well. At the end of a year, as she had not presented herself for examination, I wrote and requested her to do so. At this time she believed herself quite well, but on examining her orbit I found beneath the conjunctiva numerous little black dots of melanosis. On cutting these away more came into view, scattered amongst the cellular tissue and fat. It was necessary to clear away almost all the contents of the orbit. Two months later she had large quantities of blood pass by stool, and on ex-

amining her abdomen I found her liver very distinctly nodulated. She had by this time become cachetic. I have not seen her since, and the probability is that she did not live long after the last note.

I mention this case on account of the occurrence of an attack closely resembling glaucoma in connection with malignant disease of the choroid. In the next two cases the pseudo-glaucomatous attack was yet more acute and severe.

Case II.—John R., a healthy-looking man, æt. 40, was sent to me by my friend Mr. Steele, of Reigate, on account of failure of sight of the left eye. He said that for the last six weeks there had been a fog before the eye; that he had seen "silver stars," "black specks," and a "waving of the air, like the waving of the sea in sunshine." His other eye was perfect, but with the defective one he could only make out letters of No. 20, and these he could only make out when held in certain positions. In the direct axis of vision he could see nothing. Lines of print looked, he said, zig-zag. These subjective symptoms seemed to point pretty clearly to detachment of the retina, and, on examination with the ophthalmoscope, this conjecture was confirmed. The detachment was in the upper part, and extended to the margin of the optic disc. It was easily seen, but the floating membrane presented no features which excited my suspicion. Several other ophthalmoscopists saw the case, and examined the eye. No one suggested the existence of malignant disease. There had been no pain in the eye whatever, and there was no history of injury. There was a history that four years ago he had suffered from a severe illness, which he was told was inflammation of the membranes of the brain, and for which he was salivated. As he recovered from it he found that his left arm and leg were weak, and they remained so for several months. Previous to this attack he had been liable to most severe headaches, but from these he had been since almost wholly free.

Believing the case to be one of simply detached retina, I did not advise any treatment, and he returned to his home in the country. This was in June, 1864. I did not see anything more of him until September, 1865, when he came to me with all the symptoms of the most acute glaucoma in his lost eye. The cornea was steamy; the tension of the globe much increased, and the sclerotic dusky. The pupil was large and fixed; but

with the ophthalmoscope I could obtain only a general dull reflex. He stated that the present symptoms had set in quite suddenly a week ago. He described the pain as having been horrible, and without intermission, and said that he had not slept since it commenced. The eye had remained exactly as I had seen it a year ago until this attack commenced. Had he came to me without my knowing anything of the earlier facts of his case, I should have been inclined to treat the disease as acute glaucoma, and perform iridectomy, but as he and I both knew that for a year past the organ had been lost as regards sight, I advised the radical measure of extirpation. To this he at once consented, and I immediately performed it. The eyeball, when removed, presented nothing unusual externally, but on looking at the section of the optic nerve itself I observed a small black spot. Having scraped this spot, and placed the result under the microscope, nucleated cells, loaded with pigment exactly like those of melanosis, were seen. On cutting open the eyeball a rounded growth of melanosis, the size of half a cherry, was found just above the optic disc, between the choroid and retina. It involved the optic disc itself. It was clear, from the condition of the optic nerve where cut across, that the portion left behind was also diseased. I, therefore, placed the man again under chloroform, and with some difficulty succeeded in excising a further portion of the nerve trunk half an inch in length. On examining this portion I found that it was quite healthy where cut across, and that the melanosis extended only about a line in depth from its distal end. This patient is at present in excellent health. It is about three months since the operation.

Case III.—Mrs. G., æt. 46, a dark complexioned woman, in good health, was sent to me by Dr. Hooper May, of Tottenham, in the beginning of last May. Six weeks previously she found that she could not see a candle when the left eye was covered. She had had but very trifling pain in the eye, and had never noticed muscæ, &c. She had discovered that the eye was blind almost by accident. The pupil dilated widely when that of the other eye was covered, and it remained quite fixed until the other was again exposed. On using the ophthalmoscope we found the retina extensively detached in the upper part. As in the preceding case, I noticed nothing which suggested the existence of any new growth. No treatment was advised, and for

several months I did not again see the patient. On October 13th she again came under my care. For three days she had been suffering very severe pain in the eye. It had kept her awake all night, and was still increasing in severity. The pupil was widely dilated, and fixed. The sclerotic was congested, and the media were hazy. The tension of the globe was very much increased. The cornea was steamy, but only slightly so. On examination with the ophthalmoscope I obtained only a dull grey reflex, and could not distinguish any retinal vessels. She willingly consented to the immediate removal of the globe. After the operation, bearing in mind the lesson learnt in the preceding case, I immediately cut the eyeball open. We again found a growth of cancer. It occupied almost exactly the same position as in the other case, but it was destitute of pigment—medullary, not melanotic. On looking at the optic nerve where cut across I found that the line of section passed through a portion of cancerous deposit. I therefore at once removed another half inch of the nerve.

The patient is at present in good health, but it is only about two months since the operation.

*Remarks.*—These cases well illustrate an occasional cause of detached retina, and the difficulties of making a correct diagnosis. The two latter cases were both of them carefully examined with the ophthalmoscope at an early stage, but only the fact of detachment was discovered. They prove also that new growths in the eyeball may become the cause of sudden attacks of intense pain, attended with increased tension, and all the phenomena of the glaucomatous state. *A priori* one would have supposed that intra-ocular cancer would be attended by gradually developed symptoms—slowly increasing pain, &c., rather than by a sudden outbreak.

A practical lesson suggested by my cases is the propriety of always examining an excised eye-ball on the spot immediately after its removal.

It is very annoying to a patient to be obliged to subject him to another operation within a few days of the first. Yet in both these cases it would clearly have been my duty to have proposed this measure had I not on the spot discovered, on opening the globe, that it contained cancer. In both the optic nerve was diseased at the point of section.

*Note on the Excision of portions of the Optic-nerve-trunk.*—In excising an eyeball the optic nerve is usually cut through close to the sclerotic. Should it be found afterwards that the part left behind is diseased, the excision of another portion is by no means an easy operation. It is buried deep in the wound amongst tissues infiltrated with blood-clot, and enough of oozing continues to occur to prevent the possibility of exposing it to view. According to my experience the only feasible way is to proceed by touch instead of sight. Passing the fore-finger deeply into the orbit, the nerve trunk can, with a little care, be discovered. A pair of strongly toothed forceps may then be guided down and made to seize the nerve trunk at any distance from its end which may be thought desirable, and holding it firmly forwards, the operation is easily completed by a pair of curved scissors. I am not aware that any instructions on this point have as yet been given, and having in one case experienced great difficulty in attempt to operate by the aid of sight, I think it well to mention it.

To these cases I may add a fourth, in which I have recently excised the eye for melanosis. In this instance we had also the phenomenon of detached retina as the earliest symptom. Afterwards, as is usual, the symptoms simulated chronic glaucoma, rather than the acute form which occurred in the preceding cases.

Case IV.—Mrs. H., æt. 40, was sent to me last March by Dr. Tidy, of Hackney. For a few months her left eye had been failing. She had experienced no pain. By ophthalmoscopic examination I found that the retina just above the outer side of the disc was detached, and that a peculiarly black appearance existed behind it. The media were quite clear, and nothing could be seen by the unaided eye. I wrote to Dr. Tidy, suggesting the probable existence of melanosis, but I did not feel sufficiently confident in my diagnosis to urge an immediate operation, and our patient could still see fairly in certain directions, and was very unwilling to believe her ailment a serious one. On November 27th she again called on me. The eye was now quite blind. The pupil was dilated and fixed, the tension of the eye considerably increased. By the unaided eye I could easily perceive the reflex

of some growth at the bottom of the eye. A yellow, almost metallic, appearance was produced. With the ophthalmoscope I could not make out anything more definite than that the retina was very extensively detached. Latterly Mrs. H. had had frequent attacks of pain in the globe, but of no great severity. I now urged her to submit to an immediate operation, and we removed the eyeball the same afternoon. The diagnosis was confirmed by our finding a large mass of melanosis in the substance of the outer part of the choroid, by which the retina and part of the choroid had been pushed inwards. The mass was as large as a cherry, and of sepia blackness. It showed under the microscope numerous cells containing nuclei but no pigment, and many other much larger pigment cells. In addition to the large bodies which were loaded with pigment, the latter also existed as free granules in great abundance. The growth had not perforated the sclerotic at any part. The lens and what remained of the vitreous body were clear.

Mrs. H. recovered well from the operation, and is at present in good health. It is now two months since the excision.

## TWO CLINICAL LECTURES ON CASES OF INFLAMMATION OF THE OPTIC NERVES.*

By Jonathan Hutchinson, F.R.C.S.

### *Lecture I.* (*October 24th.*)

The term *neuritis* had long been in use amongst pathologists before the introduction of the ophthalmoscope. It implied a belief that in some cases nerve trunks themselves inflame, and although the term was often employed without any demonstration of its applicability, yet there can be no doubt that it was often quite correctly used. The ophthalmoscope has enabled us to see easily, through transparent media, and under considerable magnifying power, the termination of one of the most important nerves in the body, and we are now perfectly familiar with all the various phenomena which attend the different stages of its inflammation. It is true that we see only the end of the optic nerve, but various reasons, especially the facts supplied by *post-mortem* examination, lead us to believe that in most cases what we see at the optic disc is a fair indication of the processes which are also going on in other parts of the nerve trunk.

Here I must ask beginners in ophthalmoscopic studies to draw a very definite distinction between the retina and the optic nerve. The retina, we all know, is not, as is popularly supposed, the mere expansion of the optic nerve. It is a highly complex structure, of which the optic nerve tubes constitute but a very small part. Of this fact we see abundant illustration in pathology. The nerve may be diseased without any material implication of the retina, and the retina may inflame without the nerve. It is true that in many cases both suffer together, but even when

* These lectures were delivered at Moorfields on the evenings of October 24th and October 31st. They were addressed to the students attending the Ophthalmoscopic Demonstrations.

they do so almost always one is implicated out of all proportion to the other, and nothing is more common than for us to see cases which we can definitely call *neuritis* or *retinitis* respectively, the inflammatory process being almost wholly restricted to one or the other structure.

The subject upon which we now propose to concentrate our attention is *neuritis*. I shall select as examples of it cases in which the retina was almost wholly exempt from implication. The group of neuritis cases, as far as the optic nerve is concerned, comprises almost all those in which blindness, partial or complete, follows severe "head symptoms." If a patient has suffered for some time from severe pain in the head, giddiness and vomiting, and amaurosis has followed, you may conjecture very confidently that his optic nerves have been inflamed, and that the loss of sight is caused directly by their disorganization. This group of symptoms rarely or never attends cases of retinitis or any other disease of the eye itself, and it is found in connection with neuritis, because this latter condition is almost always produced by disease within the cranium. In further proof of this statement, we may just remark that not unusually paralysis of other nerves, often in the form of hemiplegia, and very frequently indeed in that of loss of smell, attends this kind of amaurosis. By some the term "descending neuritis" has been applied to the disease under consideration, with the intention, I believe, of implying that the inflammation usually travels from within the cranium to the eye—as it were, *descends* from the central organ.

The phenomena of optic neuritis, as seen by the ophthalmoscope, differ very much in different stages, and the recognition of the clinical fact that the stage of acute inflammation with effusion is always transitory, and often very short indeed, is most important. Unless we allow for this, and unless we learn how to recognize the results of past neuritis, as well as the evidences of its actual presence, we shall be constantly making mistakes.

Before describing these phenomena we must call to mind the anatomy of the nerve with which we have to deal —that it consists, like other nerve trunks, of a bundle of nerve tubes, but differs from almost all others in the abundance of the neurilemma by which these tubes are invested and protected, and in the possession of an additional protection in the form of a strong fibrous sheath external to the neurilemma, and easily separable from it. The remarkable strength of the neurilemma is observable from the chiasma downwards to the eye. The external fibrous sheath is derived from the dura-mater, and is only present from the optic foramen to the eye. If we follow the nerve still further backwards from the chiasma to the corpora geniculata, we shall find it soft and with comparatively little neurilemna, but in large part having an investment of pia-mater. Now, when neuritis occurs it is doubtless the neurilemna which is directly involved. It is the nuclei of this structure which proliferate, and by which the new cells are produced. It is into the meshes of this tissue that the effusions, solid or fluid, of inflammation take place. It is owing to the continuity of this structure that the inflammatory process travels from one end of the nerve to the other. Bound down by this structure, and also by the external fibrous sheath, the tubes themselves must of necessity be compressed most injuriously by the accumulation of new cell elements and fluid effusions between them. Not only will the nerve tubes be compressed within their unyielding sheath, and thus have their function suspended, but at the same time we shall also see compression of the little artery and vein, which pass in the nerve substance for the supply of the retina. By *à priori* speculation we should expect neuritis of the optic nerves to produce, 1st, blindness, owing to compression of nerve tubules; 2nd, diminution of the central artery of the retina, owing to compression of its trunk; 3rd, turgidity of the central vein of the retina, owing to compression of its trunk; 4th, visible evidences of inflammatory effusion at the

exposed end of the nerve. Amongst the symptoms which might, with less confidence, be expected, are—5th, various subjective evidences of disturbed function, such as flashes of light, &c.; 6th, pain and headache, from the swelling and tension of a structure which cannot yield (such pain, being either near the part implicated, or referred to some other); 7th, evidences of reflex or sympathetic disturbance, such as vomiting.

If we may anticipate a little, I will here state that in practice we almost always find neuritis of the optic nerves symmetrical. If it occurs in one eye before the other, it almost always quickly shows itself in the one which at first escaped. This fact suggests that the inflammation starts from above the chiasma, or exactly at that part, and thus finds its way downwards into both nerve trunks. We may further state as the result of the clinical observations of authors that optic neuritis may occur in connexion with the following causes:—1st, tumours in the brain; 2nd, arachnitis, especially when at the base of the brain; 3rd, fevers, with head symptoms (probably arachnitis); 4th, tubercular meningitis. Dr. Hughlings Jackson, to whom we are indebted for most valuable facts and reasonings on this subject,* holds that disease of almost any part of the cerebrum or cerebellum may be productive of optic neuritis; and, secondly, he has made the very important observation that when in these cases hemiplegia occurs, as it often does, it is usually on the left side of the body.

I have already said that the appearances by which we recognize neuritis in its acute stage are often transitory. Only now and then do we see good examples of it, whilst instances of its results are seen very frequently indeed. During the present course I have shown you not a few

* *Vide* Ophthalmic Hospital Reports, vol. iv, page 389, "Observations on Defects of Sight in Diseases of the Nervous System." By J. Hughlings Jackson, M.D., Assistant-Physician to the National Hospital for Epilepsy and Paralysis.

instances of atrophy, the consequence of neuritis, but no opportunity has yet occurred for demonstrating the phenomena of the early or aggressive stage. Should the patient come under our observation when the neuritis is just beginning, we may find probably only one part of the optic disc affected. At that part the disc is elevated to a degree very easily appreciated by the binocular.* The margin of the choroid is no longer to be distinguished, being concealed by the exudation in the nerve in front of it. The nerve itself, instead of showing its normal pink tint and smooth surface, is of a lilac, or light grey, colour, and looks fluffy, much as if cotton-wool had been carded until all its fibrils radiated outwards from a centre. From this peculiarity I have been in the habit of calling it "the woolly optic disc," and others have, I believe, found the term very fairly descriptive. This radiating appearance has arrested the attention of all observers, and is very well represented in Liebreich's Atlas, fol. xi, figs. 6, 8, and 9, the letter-press to which contains a concise but very graphic description of the changes.

We have supposed that we were fortunate enough to see the case at the very earliest period, and before the whole of the disc had become involved. A little later and we shall find the edges of the disc wholly concealed, the disc appearing very much larger than natural, owing to the extension of the exudation over the choroidal margin. We shall notice also that the trunks of the vessels passing to the centre of the disc can no longer be traced, but are buried in the new material, that the branches of the arteria centralis are much smaller than usual, and those of the veins much distended. It is this stasis of the capillary circulation amongst the inflammatory materials which gives to the latter its light lilac tinting. Sometimes extravasations of blood of greater or less size occur, owing

* So real and considerable is the elevation by swelling in some cases, that the erect image of it may be seen in a myopic eye without the use of concave lens. *Vide* Liebreich, page 33.

to the venous distension, but these are exceptional in cases of pure neuritis, and are much more common in certain other forms of disease.

The recognition of neuritis in its early stages is easy, for the changes are very marked. At this stage the diagnosis chiefly concerns neuritis from intra-cranial causes (that is pure neuritis or descending neuritis), and those other forms of neuritis complicated by retinitis, and produced usually by blood disease, such as syphilis and albumenuria. On this point the limitation of the changes to the immediate neighbourhood of the disc itself is one of our principal guiding facts. In syphilitic retino-neuritis the whole retina is usually affected, and the neuritis element is small.

The first case which I shall mention is one of peculiar interest, from the fact that I have had the patient under observation from the very commencement of the disease. It is that of James Oakley, a man aged 35, whose eyes you have all examined this evening. He is at present a stout, healthy-looking man but he speaks a little thickly, and is excitable in his manner. He is quite blind as regards the left eye, but can see large objects with the right. The left pupil acts a little when exposed to light. The pupil of the right is quite fixed. In a dull light the two pupils are of equal size. In a bright one the left is considerably smaller. I ask your especial attention to this fact, for you will note that it is the iris of his blind eye which acts, whilst that of the eye he still sees with is motionless: a fact in further proof of what we have often adverted to, that the activity of the pupil is not by any means always in direct ratio with the perception of light. With the ophthalmoscope we find very similar conditions in the two eyes. The media in both are quite clear, and in both the optic discs are dirty white and atrophied. Their whiteness is not of the clean milk white of mere anæmia;—of what we call *par excellence* "white atrophy." It is rather of a dirty bluish grey. The discs are somewhat depressed in the

middle; their margins are tolerably abrupt, but here and there a little jagged, with a few minute dots of pigment. The branches of the central vein are of a fair size, but those of the artery are very small. The retina adjacent to the optic disc is perfectly transparent, and the vessels can be easily traced. The choroid is perfectly healthy. Altogether there is but little in the present condition of the discs, which would enable even an experienced observer to say whether or not neuritis had preceded the atrophic changes now existing. Yet, as we shall see presently, it is quite certain that it did so. I ought to have stated that Oakley is at present partially paralytic in his right arm and leg; that he is exceedingly susceptible to the influence of stimulants, and that his wife reports that he is subject to short fits of uncontrollable passion. Before his illness he was a man of remarkably quiet temper. His hearing, his smell, and his taste are fairly good; he has a large appetite, and a craving for stimulants.

Having thus described in detail his present condition, let us now turn to the very interesting facts of his illness. Up to October, 1864, he was in the enjoyment of good health, and was engaged in one of the large city houses. On October 20th (Thursday), he came to me with the statement that he had suddenly become blind in his left eye. On rising from bed on the previous Monday, he had found his sight dim, and on trial he had found that it was the left eye only. During the next two days the eye got rapidly worse, and he could now only just perceive large objects with it. On the morning of his application, for the first time, his right eye also failed, and for a few minutes he was almost blind. Both pupils were large and exceedingly sluggish. In the *left eye* the margins of the optic disc were ill-defined, being covered by a halo of greyish white. The veins were exceedingly turgid, the arteries very small. Slight pressure on the globe sufficed to empty the veins entirely on the surface of the disc. The media were quite clear, and excepting at the optic disc, the fundus was quite

normal. The *right eye* showed conditions exactly similar, but less advanced. The arteria centralis was larger, and the vein not so turgid. In both eyes the surface of the disc had the appearance of being swollen and elevated. We had, therefore, a very marked example of optic neuritis in its earliest stage. Let us note the constitutional symptoms which attended it.

They were exceedingly slight. During the last week our patient had had frontal headache, "like something shooting above the eyes," but it had not kept him awake ; he had on the contrary been very sleepy. Until this illness he had scarcely known what it was to have a headache. During one day previous to his admission he had been very giddy, and this also was a symptom which he had never experienced before. He had had no vomiting. He looked pale, and his lips were rather dusky, and on being closely questioned, said that he had lost flesh of late, had suffered very frequently from bad colds in the head, and had been accustomed to perspire very freely. Beyond this we could make out nothing as to symptoms of disease of the brain. The remedies prescribed consisted in hot pediluvia, purgatives, and a blister to the back of the neck. On October 24th he was quite blind with the right eye. The discs in both eyes were very much more swollen, the edge of the choroid was quite concealed. There were no extravasations. He reported his headache as better, but he had still some severe pain. On the 27th he was in total darkness. The ophthalmoscope, as before, showed the discs swollen, elevated, and woolly. The turgid veins were seen dipping into the effused lymph, but no branches of the artery could be distinguished. We now ordered him a grain of calomel every two hours, and another blister at the nape of the neck. The effect of the mercury was apparently very decided. It was pushed to salivation, and ten days after its commencement the quantity of lymph was very much less in both eyes, and with the right eye he could count fingers. From this time the absorption of the lymph was steady,

but beyond the perception of large objects, he did not materially improve in sight.

After this, however, the cerebral symptoms developed themselves. He became hemiplegic on the right side, and to a large extent lost the use of language. He was now admitted under my care into the London Hospital, where he remained from December 22nd to March 7th. During the whole of this time he was very ill, paralytic, helpless, and childish. His paralytic symptoms were complicated, and difficult of explanation. The following notes written at his bedside on January 3rd and 4th, describe his condition in some detail. It will be seen that at this date we had the curious symptom, which is still present, of dilatation and fixity of pupil in the better eye; (probably owing to disease both of third nerve and of the vasomotor fibres on this side.)

"*Tuesday, January 3rd.*—Tongue very dry. Lips dusky. He is conscious, told me my name, told me that he had pain in his stomach, although articulating with great difficulty. When asked where he was he only mumbled and did not produce any intelligible word. His left eyelid drooped so as almost to cover the eye. His face was drawn to the left side, but not very much. On testing the sensation in his cheeks, he gave us to understand quite clearly that he could feel much better on the left side. On touching his eyes he winked strongly with the left eyelids, but could not close the right ones. Both pupils were widely dilated, and there was no material difference between them.

"I found his right foot very much hotter than his left. His right was very hot, his left cool. Both had been equally well covered.

"I could not detect any difference in the relative temperature of his two upper extremities. He gave me to understand that he had no headache. His bowels had only acted twice in the week; each time after castor oil. His water passes away unconsciously, but he is able at

times to let the nurses understand. He can draw his right leg up, but he moves it very little."

"*Wednesday, January 4th.*—Both his feet to-day are equally cold and pale, decidedly chilly. There is no decided difference in the temperature of the two arms. In other respects he seems much as he was yesterday."

A few days ago he was restless, throwing the clothes off, &c., but during the last three days he has lain in a quiet sleepy condition. When roused, his intellect seems clear. I pinched his two hands, and asked him which he felt best in, and he said the left, and I found that he clearly understood what he meant. He can move the right arm a little, but only very little, and when told to close his eyes the muscles on the right side do act a little, but very much less than those on the left. He can open his right eye easily, and let it drop shut. The left eye he cannot open more than a very little.

"There is no very positive strabismus in any direction, but he moves his left eye rather more slowly than the other. Both pupils are dilated, but the right is more than twice the size of the other. Both are absolutely motionless. In both eyes the optic disc is pale and grey, and the veins and arteries are very much diminished in size.

"On the right side he can hear a watch pressed over his ear, but he loses it at the distance of one inch. On the other side he appears to hear well.

"I do not perceive any difference in the relative temperature of his two ears. The masseter and temporal muscles on the right side act very much less than those on the left and appear to be wasted.

"He has never been sick, takes his food well, and eats mutton chops. He says he eats on his left side. He sometimes splutters in drinking, but, as a rule, he swallows well. He has never had any convulsions."

The following is the note on March 14th. "Oakley left the hospital a week ago. He had been improving for a fortnight before his discharge, both in general health and

in intelligence. He was still quite paralysed in his right limbs, and the right side of his tongue also looked thin and flabby. His tongue did not materially diverge. The ptosis of his left eye had nearly passed off. He could speak clearly, and seldom used words wrongly. Had great difficulty in getting him to remember where he was; indeed, he never told me right. Sometimes he would reply, "In St. Mary Axe," sometimes "In Austin Friars," sometimes at the "Insurance Office;" and, although I always explained to him where he was, he could not retain the knowledge for more than a few minutes. He never forgot my name and always recognised me. He was very cheerful, and usually answered questions quickly. At the ends of sentences he would mumble and become unintelligible. This evening his wife calls and reports that since his return home he has still further improved. She even thinks that he can see at times with the right eye. He is dressed each day, and with a little assistance can stand, although still paralysed in the right limbs. He eats well. She says that his memory is very fair, and that he can say almost anything, only he often miscalls things."

On May 8th.—The notes state that he could see large objects, and that although his face was still a little to the left, he could whistle and could frown on both sides of his face. "Speech and use of language perfect, excepting a stutter in commencing sentences. His right arm he cannot move in the least, and sensation in the right limbs is very much impaired. He feels a touch very indistinctly, and cannot appreciate the two points of the compasses when three inches apart. His lower extremity is not so completely paralysed. He sleeps well; has no headache; his smell seems tolerably good."

From the date of the last note up to the present time he has continued steadily to improve until reaching the condition in which you have seen him this evening, and which I have already described.

If we attempt to speculate on the nature of the intra-

cranial disease with which the neuritis has been associated we shall undertake a very difficult task. The remarkable manner in which the man has got rid of paralytic symptoms of the most severe kind, has lost his headache, and has regained good general health, seems to put out of view the existence of a cerebral tumour, and favours the hypothesis of arachnitis.

Had he permanent loss of smell this hypothesis would be yet further strengthened. I will now read the particulars of the case of another patient whom in former sessions you frequently had opportunities of examining, and in which we ultimately had a post-mortem examination.

Walter Snell, æt. 28, came to us at the Ophthalmic Hospital in a state of almost complete blindness from the effects of neuritis. He had just been discharged from the army in consequence of his condition. His optic discs were bluish-white, and somewhat depressed. The margins of the choroidal rim in the right eye were a little jagged, but in the left were well defined. The branches of the arteria centralis were much diminished, but still easily traced. Those of the vena centralis were of normal size. He appeared to be in good health and had no other paralytic symptoms. He complained much of pain in the right temple, holding his hand to the part. Whilst we were examining him he became faint.

The history of his attack was as follows :—Until a few days previous to January 1st, 1864, his sight was perfect; then his right eye began to fail, and on New Year's morning he went into the military hospital with this symptom. He had some pain about the right eye, and a blister was applied to the right temple, which relieved it. Five days after his admission his left eye in the course of one night became quite blind. At this time he had very severe pain in the forehead over each eye. The pain was so intense and so unremitting, that he thinks he never slept for one week. His head was shaved, and a blister ap-

plied across the forehead. This blister gave him the greatest relief, and he was without pain for several weeks afterwards. He left the hospital after a stay of three months and came up to London, where he was admitted under my care on April 28th. At this time, as I have already stated, all evidence of recent neuritis had passed away. He was quite blind of the left eye, and could only just perceive large objects with the right.

In our inquiries as to the man's previous history, we learnt that about four years ago he had received a violent blow on the left forehead with a knobbed stick. He was stunned by the blow and was under treatment for several days after it. On careful examination of the part said to have been struck we could not detect any evidence of thickening, and during the three years' interval between the injury and the neuritis he had enjoyed excellent health. He had never had syphilis. He had never been liable to giddiness or to headache; nor had he had any vomiting whatever. He had served in the Crimea and in Bengal, and in the latter place had suffered from ague.

About a fortnight after Snell commenced his attendance at the Ophthalmic, I was one day summoned hastily to his brother's house, with the statement that he had had a fit. I found him incoherent in his talk, and slightly, but decidedly, weak in the left limbs. During the next few days the paralysis diminished.

On June 20th, we admitted Snell into the London Hospital in order to be able to watch the treatment more continuously. Mercury was administered to salivation, and with some apparent benefit, but it was not permanent. He remained in the hospital four months, and during almost the whole of this period suffered from intense pain in the head. Often for days together he would lie in a semi-stupified condition, apparently the result of the severe pain. His pupils were usually widely dilated and fixed. He took large doses of morphia with very little result. Hypodermic injections were used, and on two occasions he

was put so fully under the influence of opium that his pupils were contracted to mere points.

He would frequently pass his urine and fœces unconsciously.

At length, without apparent cause, he began to improve, and in November he was able to leave the hospital. From November to February he attended at the Ophthalmic. He was now quite blind, but had almost wholly recovered from the weakness of his right limbs. He still had severe pain in the head. Vomiting now frequently occurred. He had complete loss of smell and taste, so that when he would ask for ale, and water was given him, he did not seem to know the difference. In January and February he was confined to bed at home, and had a succession of epileptic fits, and became at times almost maniacal. After a succession of convulsions he became much exhausted, and died February 20th.

At the autopsy we found no evidence of injury to the skull, either external or internal. The general mass of the brain was remarkably soft. Beneath the anterior lobes and extending backwards in the middle line almost to the crura, was a large quantity of organised inflammatory material. The olfactory bulbs, the optic nerves and adjacent parts were matted together by very firm adhesions, and the cerebral lobes broke down in the attempt to remove them. The optic nerves were so much softened that it was difficult to distinguish them from the lymph in which they were imbedded. Three small isolated collections of thick semi-purulent fluid were found in the midst of the organised lymph. There was nothing that looked like tubercle or any form of new growth. The membranes on the upper surface of the hemispheres were healthy, and, excepting the conditions described, no disease was found within the cranium.

The disease appears in this instance to have been essentially a local chronic arachnitis, but its cause is still very obscure. As an interval of three years of health had

intervened between the blow and the cerebral symptoms, we can scarcely suspect any connection between them; otherwise the case which I am about to relate might have led us to entertain such a supposition.

Three weeks ago I was called to Epsom, in consultation with Mr. Owen, of Leatherhead, to see a little boy who was suffering from cerebral symptoms, supposed to be consequent on a fall down stairs, in which his head had been struck. Our patient, when I saw him, was almost wholly insensible. His left limbs were weak, and his right eye had a dilated pupil, was insensible to light, and the globe itself remained motionless in the orbit. It appeared that all the ocular muscles were paralysed. He moved the other eye freely and its pupil was fairly active. The conjunctiva of the right eye was congested and in a state of chemosis. There was a turgid vein on the right temple, which had no fellow on the left. From these conditions I diagnosed arachnitis at the base of the brain on the right side; judging that the right cavernous sinus was probably obstructed by thrombus, and that the adjacent nerve trunks were paralysed by the effusion of lymph about them, I had used the ophthalmoscope and had found evidences of neuritis at the optic disc. The injury to the head had been received three weeks before any symptoms of cerebral disease had set in, and had been almost forgotten, but it was now remembered that the boy had throughout that interval seemed heavy and stupid. His first serious symptoms had been a shivering fit, and after that, sickness and constipation. He died a few days after my visit. A post-mortem examination was obtained by Mr. Owen, who informed me that our diagnosis had been fully confirmed, and that the nerves passing into the right orbit had been found matted together by recent lymph.

*Lecture II., October 31st.*

Amongst the patients whom we have examined this evening, was one in whom we conjecture that the neuritis may possibly have been of syphilitic origin. At any rate, she had had constitutional syphilis some years before her attack of neuritis, and there is an absence of any indication of other cerebral disease, such as tumour. If syphilis is a cause of optic neuritis it is probably not very frequently so. I have seen, however, a few patients, especially the subjects of inherited syphilis, in whom amaurosis with atrophy of the nerves had occurred. We know that deafness, probably from nerve disease, is fairly common in inherited syphilis, and occurs occasionally as a consequence of the acquired form. We know also that paralysis of the fifth nerve, or of any of the motor nerves, of the eyeball is frequently met with as a syphilitic disease. Whenever syphilitic disease of a nerve trunk occurs it is always as a tertiary symptom, and at a long interval after the primary infection. Retinitis, as you are aware, is on the contrary, a secondary symptom, and usually occurs co-temporaneously with iritis three to six months after the primary disease.

Mrs. A., aged 30, is now a healthy-looking woman, she has attended at our demonstration this evening, and you have all had opportunities for examining her optic discs. Both her pupils are widely dilated and quite fixed. She has the barest perception of light, and cannot tell even where the windows are. Both her optic discs are of grey-white colour, quite flat, their margins are somewhat jagged and indistinct, but not much so. At one or two places the trunks of the vessels close to the margin of the optic disc are obscured by a white film, but this is very limited. In each eye the central artery and vein are of fair size.

Mrs. A.'s history is that up to last September she could

see perfectly, but for years she had been subject to pain in the occiput, giddiness, and noises in the ears. She has been married ten years, and five years ago her husband gave her the venereal disease. The local symptoms were followed within a few weeks by a rash and sore throat. Since that she has been much under medical treatment, and has had five miscarriages and one living child. This child in its infancy had specific symptoms. Her amaurosis commenced in September last. Loss of appetite and sickness were the first symptoms. She had afterwards great pain in the head, and was for some weeks confined to her bed and almost insensible. At one time her left limbs were weaker than the others, but they were never paralysed. On recovery from her illness she found that she was quite blind and had utterly lost her smell. Her hearing remained perfect. Eight months have now elapsed since her recovery, and during this time she has been free from symptoms. She at present appears in good health, is free from headache, has no sickness, and, excepting the complete amaurosis and anæmia, she has no symptoms referable to the nervous system.

A second case, with almost a precisely similar history, was before us a few weeks ago. The subject of it is a married woman, æt. 35, who suffered from primary syphilis followed by rash and sore throat ten years ago. She thinks that she took mercury for it, but her gums were not made sore. Ever since she has been liable at times to scattered blotches on the skin and sores on the tongue. She does not appear to have ever had periostitis of superficial bones. Her eyes began to fail about five years and a half ago, and within three or four months of the first perception of fog she had become totally blind. She had at the time a little headache, but there do not appear to have been any concomitant symptoms. She complains now of great depression of spirits, but, excepting the amaurosis, she has no paralysis. Her smell is good, as also is her hearing and

sense of touch. With the ophthalmoscope precisely similar conditions were found in the two eyes.

The media are perfectly clear. The optic discs are very conspicuous and very white, round, abruptly margined, quite destitute of pink stippling. They are somewhat depressed in the centre by atrophic shrinking. The arteria and vena centralis are each of almost normal size, and being placed on a white ground are very conspicuous. The choroid is healthy. It must be observed that in this case we have no proof that any stage of neuritis ever occurred. The conditions now present are suggestive rather of white atrophy than of the results of inflammation. In the history of the original attack we also miss, as regards the symptoms of pain in the head, vomiting, &c., which usually attend neuritis. Its probable connection with syphilis, however, leads me to mention it here in connection with the preceding case.

[To be concluded.]

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Part I.

## Original Contributions.

### A LECTURE ON POSTERIOR STAPHYLOMA, WITH SPECIAL REFERENCE TO TWO SINGULAR CASES.

(Concluded from Page 87.)

With a Supplementary Note on Posterior Staphyloma (so called) and Hypermetropia.

By J. F. Streatfeild.

The other case which I have to bring to your notice this evening is less singular, but it has many instructive features.

Martha Meady, aged 50, a widow, of late a servant, came to Moorfields for advice in March last, towards the end of the month. Three years ago she first noticed that the upper lid of the left eye drooped. She said she could not open the eye widely. Then both upper lids drooped, and to a slight extent this has continued. About that time she had jaundice, after which she recovered almost completely the power of raising the upper eyelids. Since last Christ-

mas there had appeared, as it were, a fog before the left eye, and for a month or more the right eye had become somewhat dim. This was increasing, and for it she came to the hospital. Since Christmas she had had occasional pain over the left eye, and headache when she rose in the morning. She found she was obliged to hold things closer and closer, but anyhow she could hardly see to thread a needle. She was subject to rheumatism, but had had no other complaint. She attributed her failing eyesight to the "change of life" which occurred in her about last Christmas. She could hardly read No. 12 of Jaeger's types with her right eye without glasses. This she could best manage at about seven inches. Since then and recently I have found she can only read Jaeger's No. 14 with this eye. With the left eye she could then, and can still, only see light objects. Her sight had been years ago, she thought, as good as other people's, even for distance. Her parents had had good sight also. She had never had any complaint of the eyes before the ptosis occurred, three years ago. She had never worn glasses. Had never done much needlework, or "tried" her eyes. In fact, the history was one of altogether negative importance, and so I need hardly relate all her answers to my inquiries.

On ophthalmoscopic examination I found a considerable posterior staphyloma in either eye in the common situation to the outer side of either optic nerve entrance. They were also about symmetrical and of equal extent in either eye. In both staphylomata there were very considerable traces of the structure of the choroid, some of its vessels remaining, and great quantities of pigment, which in some parts appeared to be irregularly massed pathologically, and elsewhere it seemed to map it out into what had been the choroidal intervascular pigment islands in the normal condition. The red choroid around the white spaces was in both eyes pale, but unequally so. In both the pigment islands were well seen, and some vessels among them. Any blood holding choroidal vessels in the white space

could be, of course, very well seen, but of these the finer ones could not always be traced in the red choroid.

I must refer you to Plate 2 in explanation of the ophthalmoscopic appearances I am attempting to describe to you. It is better than any other account I can give of the case. The peculiarity of the case consisted in the very incomplete state of atrophy in which the disease had left the choroid, or rather, I should say, in which I found it, the great quantities of pigment it had left behind, and the bright red vessels seen coursing over the staphyloma and among the masses of pigment.

In the right eye of this patient I would further point out to your notice two peculiarities. First, that there is an inner crescentic shaped lighter portion of the white space, which is next to the optic nerve entrance, and that external to this is another equally crescentic portion, the remainder of the light space, and complement of the whole, in which there are much more extensive remains of pigment than in that part next to the optic nerve entrance, and in which only are the few remaining vessels of the choroid which contain blood. There are none in the inner portion of the staphyloma, which is, no doubt, the oldest portion. In the second place, you should remark at the upper part of the staphyloma of the right eye that in the red choroid beyond the staphyloma there is a faint pigmented line, a continuation upwards of the external curve of the outline of the now, so-called, staphyloma. This, I take it, will probably form a boundary to the next extension of the staphyloma, or at any rate of the white space in this direction.

In the left eye, besides the remains of choroidal pigment and vessels in the light space, I would only remark the peculiar way in which a retinal vein marks out its upper boundary, for it would not be extraordinary if a choroidal vessel was at the limit of the part that is considered to be staphylomatous. She was very amblyopic, for the posterior staphyloma in her eyes was not very

extensive, and although she was myopic of the eye she could still read with, yet she could not see *well* at *any* distance, or with any glasses. You should remark that the bulging of the staphylomata in this case must have been very slight, if, indeed, there was any *localised* bulging, for the outlines of the optic nerve entrances are particularly convex externally, at that part of their circumferences next to the staphylomata, the light spaces in the fundus of either eye, as if the optic nerve was drawn sideways more than backwards. There was no mistake in this case about her being myopic, the globes lengthened antero-posteriorly: the inverted image, by the direct method of examination with the ophthalmoscope, is a sure test of this. Comparing the two eyes, I think it was impossible, by ophthalmoscopic examination, to have told that vision of one eye was so much worse than of the other, or, indeed, that in both it was so very imperfect. The left optic nerve entrance was somewhat paler, and seemed *flatter* than the right. The choroid of either eye was, as I have said, unequally pale, more in some parts than in others, but the choroid of the left eye was, of the two, altogether the palest, and the pigment islands least distinctly marked, but this was all. The tension of either eye was normal, and alike in the two. I suppose that probably the white space or staphyloma of the left eye was of old standing, and that probably this eye, with which she could see so little, had been long disused, for the choroid, although thin, was rather equally thinned, and not so much at any part near the atrophied choroid, as if any extension was progressing just at the time when my drawing was made, nor was there any apparently definite limit peripherally to this thinner choroid. But of the right eye, if I may continue to speculate on the probabilities of the case, for I have no knowledge of the patient before her recent short attendance here, I should say that the outer darker segment of the light space in this eye shows the recent extension of the disease in her useful eye, for

which she was induced to come to the hospital. Not necessarily, of course, that this additional or secondary outer crescent defines an extension of the sclerotic staphyloma, but of the choroidal atrophy consequent upon an extension of sclerotic staphyloma. Probably, I think, the sclerotic staphylomata in her case were, in each eye, merely an extension of the sclerotic, etc., generally, towards the posterior pole. There were no detached patches of atrophied choroid, nor are they generally found. In the case of Cronin* there were none, except the remarkable one which, *as a distinct staphyloma*, occupied the yellow spot (the staphyloma involving the optic nerve being in this case directed *away* from the posterior pole, the yellow spot). In his case the peculiarity was not that there was a posterior staphyloma involving the region of the yellow spot, but that this staphyloma was quite distinct from the staphyloma involving the optic nerve, which was co-existent. In Meady's case, both globes were undoubtedly prolonged posteriorly, but, according to the generally received meaning of posterior staphyloma, the term is much more readily applied to the staphylomata in Cronin's right eye, which had every appearance of being excavated, from the way in which the light was reflected and shadow thrown, from the curved course of the (short ciliary) vessels in the extraordinary staphyloma, and from the evident displacement of the optic nerve entrance seen in the ordinary staphyloma in his case as in others. If these white spaces seen in the region of the yellow spot and optic nerve, are still generally called posterior staphylomata, you certainly must not imagine them always to be like staphylomata in the front of the globe, in the cornea or ciliary region. They may be neither thinned nor bulging, nor even localised, excepting that they affect the posterior pole of the eye. *There may be no myopia in an eye in which there is a well marked crescent*, so that there may be no lengthening of the globe posteriorly.

* Page 86.

To return to Cronin's case: you will observe that the extraordinary staphyloma, like most posterior staphylomata, has a border of black pigment. So it is also in the atrophied spaces, when the choroid, independently of the sclerotic, has been inflamed in patches, as in the results of disseminate choroiditis. But I call this extraordinary appearance, in Cronin's case, a staphyloma, because at that part, as I have said, the sclerotic seemed to be bulged, because there were no abnormal patches elsewhere in any part of the choroid, and because it occupied exactly the posterior pole *towards* which posterior staphylomata generally have a peculiar tendency. That the staphyloma around the optic nerve entrance in this case had developed itself, for some reason, *chiefly* in a direction *away from* the posterior pole (the yellow spot), may possibly have occasioned the development of the central staphyloma independently. The former staphyloma may be likened to the conical cornea in those cases in which the most prominent part is eccentric. And it may be fairly a question, I think, if the same cause, the lateral pressure of the muscles of the globe of the eye, may not generally lead to the bulging of cornea, when weakened in structure, at the anterior pole in the one case, that produces staphyloma *towards* the posterior pole, when the sclerotic is weakened in the other. That the posterior staphylomata *usually* are seen, not at the posterior pole, but only inclined towards it from the optic nerve entrance, may be possibly because the sclerotic and choroid coats are not here continuous, and because of the constant movements of the nerve with the movements of the globe, at the point of its perforation of the sclerotic. There is not, generally, an increase of intra-ocular pressure in cases of posterior staphyloma, but if there were, the sclerotic will not *suddenly* give way at all, so that an increase of intra-ocular pressure bulges the optic nerve entrance itself, which has less normal power of resistance. Therefore it is probable that posterior staphyloma is always preceded by some

slight sclerotico-choroiditis posterior, or a slight localised inflammation of the sclerotic next the optic nerve entrance near the posterior pole. But to leave all matters of conjecture, I may add, as an interesting fact in the history of this case, that I made a careful map of the extent of the vision in the eye in which there was the extraordinary posterior staphyloma, and I found that the retina in its situation at the yellow spot, was almost blind, and that those parts of the retina which were beyond it, externally, were so also. Fixation was central. He could not restrain the constant tremulous movements of this eye laterally, and this added much to the difficulty of ascertaining the amount of vision left in different parts of his retina, in an eye habitually neglected. He could only see objects distinctly with this eye, to his right side; in this direction his extent of vision was tolerably good.

Neither of the staphylomata in Cronin's right eye had any of the choroidal vessels or pigment in their area, of which there was so much in both eyes of the other case. His sclerotic seemed quite bared. The cases were quite different. I have said that both were of the *progressive* kind of posterior staphyloma. This is, I think, evident, independently of their history. Meady's right eye showed where an addition had been made to what had been a smaller patch of choroidal atrophy; it showed also a probable stage of its next advance. In her left eye the choroid about the existing crescent showed some thinning and irregular pigmentation. In Cronin's case the ordinary staphyloma was symmetrical in the left eye; I think they were of old standing, perhaps congenital, and were not progressing. They were so well defined, the choroid in their neighbourhood showing no appearance of thinning, or any effects of inflammation. Nor did the choroid adjoining the extraordinary staphyloma in his right eye, but in it were broken circles of streaks of pigment, showing in strong contrast *within its margin*, far beyond it in all directions, especially inwards. There were none of these left

within the margin of the ordinary staphyloma of either eye in this case.

I am very sorry not now again to be able to show you Cronin's case. I gave him some assistance towards obtaining a situation, and now I do not know where he is.

In conclusion, I am sure, you will allow that both these cases are at least worth consideration. Ophthalmoscopic investigation is altogether so new, that we not unfrequently find cases believed to be unique, and cases supposed to be rare, become almost common events at this hospital, and I have no doubt elsewhere.

## Supplementary Note, March, 1866.

### *Posterior Staphyloma (so called) and Hypermetropia.*

In cases of white crescents adjoining the optic nerve entrance, we frequently fail to observe any one of the appearances of bulging of sclerotic, either speaking generally or as if it were confined locally to the area of the white space. The optic nerve entrance is not inclined towards that part at which the apparent staphyloma is most extensive, the retinal vessels on the light surface are not at all straightened, the centre of the area of the white space seems to be on a level with the surrounding choroid, and no shadows are cast at its margins. One of the cases in the preceding lecture was that of an elderly woman, and there was, in her case, no appearance of any localised staphyloma, properly so called, but she was myopic. Now there may be crescents, that is to say, what are commonly called posterior staphylomata, and exactly the opposite state of refraction of the eye, there may be actually hypermetropia, and consequently the globe may be too short from before backwards, instead of being, as it is always, theoretically, prolonged backwards. I have never seen very large crescents, or irregular white spaces, in the

same position with hypermetropia, but I have now, lately, seen several instances of slight but unmistakeable crescents, requiring convex glasses. In one of them the hypermetropia was of $\frac{1}{10}$.

It is better to speak of the appearances seen with the ophthalmoscope in these cases generally as "crescents" (for even when the disease is considerable and the white space is composed of different portions connected together, they are always more or less crescentic), unless it has been ascertained that the patient is myopic, in which case it is tolerably certain that there is lengthening posteriorly, which is all that is *necessarily* implied by the term posterior staphyloma.

I am led to append these remarks to my lecture, in which I have said of one of the cases, which I have just again alluded to, that "there was no mistake about her being myopic," because the last case of crescents and hypermetropia I have seen is in some respects the most remarkable. In extent, the crescents were greater than in any case of crescents and hypermetropia I had previously seen, and, in the larger of the two, for they were symmetrically placed in the two eyes, the optic nerve entrance seemed somewhat displaced towards the crescent, or, at any rate, it appeared to be a little oval in a contrary direction to the breadth of the white space. The larger crescent was in the left eye—I had thought of giving a diagram of the size and shape of this crescent, but I think I can briefly and accurately describe it. This crescent was at the lower, and a little to the inner, part of the margin of the optic nerve entrance, regular in outline and well defined; at its greatest width it was of half the diameter of the optic nerve entrance, of which it embraced about half its circumference. The case will be reported among the cases shown at our present course of ophthalmoscopic demonstrations (see next No. of this Journal. Ed.). I have never seen any crescents in hypermetropic patients that were not apparently of the kind I have characterised in

the preceding lecture as "stationary." If, in the case just alluded to, the optic nerve entrance was really displaced towards the crescent, and was not really changed in form as distinguished from an *apparent* change in form, we must suppose the staphyloma was a curious specimen of an entirely localised nature and very limited extent, and that notwithstanding its existence the globe was not lengthened posteriorly, for by the ophthalmoscopic tests and by glasses it was proved that although amblyopic the eye was hypermetropic, in fact, too short.

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## DESCRIPTION OF THE PLATES.

Plate 1, Cronin's Case, see page 86, et seqq.—The peculiar form of this figure, as of two intersecting circles, was adopted as an expression of the fact that the drawing was made at two separate points of view so near together that at each of them some part of the same portion of the fundus was seen, as at the other.

It shows the inverted image of the right eye of Cornelius Cronin,—a large ordinary staphyloma, but not in the ordinary direction, surrounding the optic nerve entrance, and a larger, almost circular, extraordinary staphyloma occupying the position of the yellow spot: the latter reflects light most brilliantly from the bottom of it; short ciliary vessels appear in it, but, as it is at the yellow spot, no retinal vessel crosses it. Around both staphylomata much pigment is heaped up. The choroidal pigment epithelium is tolerably abundant on the right hand half of the figure, and is almost all gone on the left, where, therefore, choroidal vessels are plainly seen.

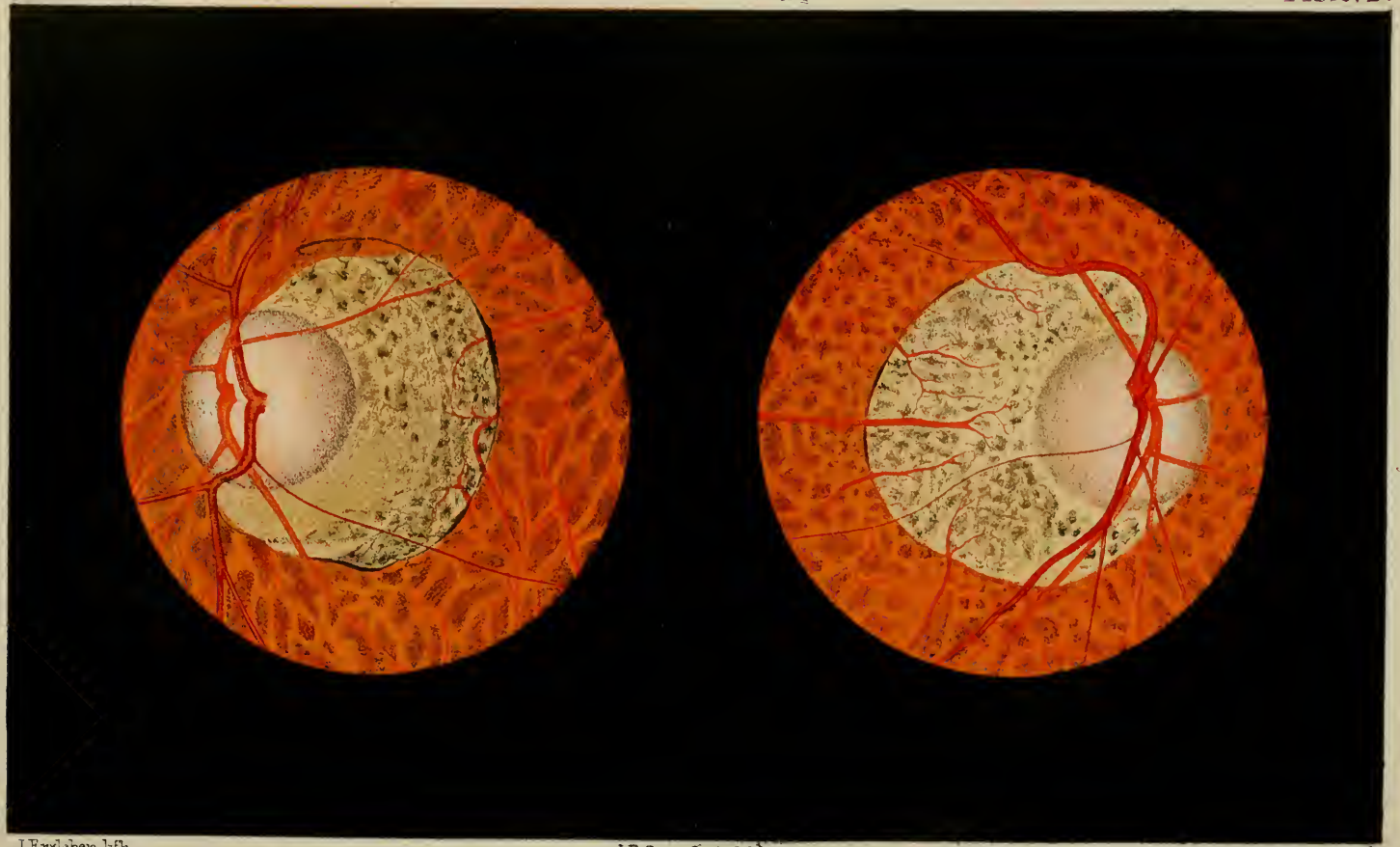
Plate 2, Meady's case, shows the inverted images of the optic nerve entrances and neighbouring parts of both eyes. In each, although the white crescents are considerable, the optic nerve entrances do *not* appear to be displaced. The two figures are nearly symmetrical.

Right eye: This shows an inner or primary, and an outer or secondary crescentic portion of the whole crescent: the latter contains most pigment and some blood-holding choroidal vessels. In the red choroid, at the upper part of the figure, may be traced a line of continuation of the outer curve of the white space.

Left eye: This also shows much pigment and many blood-vessels in the white space, which is bounded to some extent at the upper part of the figure by a retinal vein. The pigment islands in the red choroid appear to be more divided than in the opposite eye.

Inverted image.

Plate. 2.



Right Eye.

Left Eye.

J. Erxleben. lith.

J. F. Streatfeild, del.t

Hanhart, Imp.t

## CASES ILLUSTRATING CERTAIN PATHOLOGICAL CONDITIONS OF THE VITREOUS HUMOUR, WITH REMARKS.

By J. W. Hulke.

The following cases were read at a meeting of the medical staff of the Royal London Ophthalmic Hospital, held March 5th, for the discussion of ophthalmic subjects, for the purpose of showing that some pathological changes which are often observed in the vitreous humour, generally in connection with inflammatory processes in the vascular coats, and are commonly incorrectly spoken of as exudations and films of lymph intruded into the vitreous humour from without, are really hyperplastic derivatives of the normal elements of the tissues of the vitreous humour itself. In order to show this it was necessary, in the first place, to describe the normal anatomy of the vitreous humour, so far as it is known.

The vitreous humour is, generically, a portion of subcutaneous tissue pushed in before the blind involution of the skin of the fœtal head, out of which the lens is developed, and accordingly, in the perfected eye, it is bounded by the back of the lens, the retina, and the structure known as the pars ciliaris retinæ. In the fœtus at full term Mr. Bowman has described its minute structure as a web of stellate cells similar to those of the enamel pulp. In the adult the vitreous is a cellulated tissue enclosed in a structureless membrane, the membrana hyaloidea, which is distinct from the membrana limitans interna retinæ. Notwithstanding the researches of several able observers nothing certain is known about the arrangement of the cellules. The spaces are filled with a slightly viscid albuminoid substance—mucin; and the membraneous walls are dotted with round and roundly oval nucleated cells between ·0002325″ and ·0006975″ in diameter (Pl. 4, Fig. 1). In the

adult vitreous humour neither blood-vessels nor nerves are demonstrable, but in the fœtus an axial tubular involution of the hyaloidea transmits vessels from the optic nerve to the back of the lens, and there is also a superficial vascular net, which persists in the hyaloidea throughout life in some of the lower vertebrata, but which in man ultimately lies in the inner layers of the retina.

There is a striking analogy between the appearances observed in inflammation of the vitreous humour and cartilage. The changes described here are essentially hyperplastic in their nature. They manifest themselves by an excessive energy of growth and reproduction, and this takes two directions—one characterized by fibrous outgrowths from the cell wall, the other marked by the excessive production of cells by the proliferation of the nucleus.

Case I.—*Hyperplasia of the Hyaloid Cells, producing fibre and endogenous broods, with rupture of the hyaloid septa, and synchysis of the vitreous humour, occurring in the course of chronic inflammatory processes in the vascular coats, and in particular of those of the ciliary region, the sequelæ of purulent ophthalmia, with sloughing of the cornea, and escape of the lens.*

A dull, heavy peasant girl, æt. 14, was admitted into the Royal London Ophthalmic Hospital December 10, 1864, with large anterior and ciliary staphylomata of the left eye, which was so prominent that the eyelids could not be closed. This eye was often red and painful. The right eye had M$\frac{1}{5}$, and presented the usual ophthalmoscopic signs of a posterior staphyloma. The cornea was hazy, and there was a dense circumscribed speck on it, and on the lens. These morbid conditions were sequelæ of ophthalmia purulenta neonat.

I enucleated the right eye, on account of its being a constant source of trouble, and for her personal appearance, in order to allow her to wear an artificial eye.

*Dissection.*—The globe had an oblong shape, measuring 14‴ in its antero-posterior diameter, and 10$\frac{1}{2}$‴ in its transverse equatorial. The lengthening had chiefly taken place in front of the

insertions of the recti tendons. The ant. stapyloma consisted of fibrous tissue disposed in bands more or less parallel to the surfaces, and pervaded by blood vessels. The outer surface had an epithelial coat resting upon a clear bright band, one-fourth of the normal thickness of the ant. elastic lamina. No trace of the posterior elastic lamina or epithelium was discoverable, but the inner surface of the fibrous tissue constituting the front of the globe was lined by the iris frayed out. The ciliary sclerotic was much thinned, and the ciliary processes were scattered and withered. The zonula Zinnii formed a diaphragm, with a large central perforation, from the edges of which a fibro-membranous web, containing many of the stiff characteristic fibres of the ligt. susp. lentis, was gathered to point, lying at the nasal side of the axis of the staphyloma anticum. Through this perforation the space between the back of the iris and the zonula Z. communicated freely with the vitreous chamber. What remained of the vitreous humour was a crumbly, granular mass forming a thin coat on the retina. The centre of the vitreous chamber was occupied by fluid in which there were a few minute floating membranous shreds fixed to the optic nerve and its immediate neighbourhood.

The choroid was atrophied, its elastic lamina was thickened and dotted with colloid knobs. From the optic nerve to the ora all the retinal layers were recognizable, except the bacillary which was disintegrated. The nerve-fibre layer was thin, and in connection with this wasting the surface of the optic nerve-disc was slopingly depressed.

The floating shreds consisted of structureless membrane, dotted with cells identical with those normally present upon the hyaloid septa, and overrun by fibres with peculiarly sharp, hard, outlines (Pl. 4, Fig. 2). The largest fibres had a diameter of about $\frac{1}{6000}''$, the smallest of $\frac{1}{18000}''$, and under. Their length, in some preparations, was very great, reaching $\frac{1}{50}''$ and more. In these instances they had a parallel arrangement, and formed bands wrapt about with structureless membrane, which projected in festoons beyond their edges. (Pl. 4, Fig. 2.) In other preparations the fibres interlaced in a very irregular net. (Pl. 4, Fig. 3.) They were, in both instances, evolved out of the cells by outgrowth of the cell wall. The appearances suggested coarctation of the structureless membrane by the contractility, physical or

vital, of the fibres. In addition to the fibres there were, in the band-like shreds, other cell derivatives of a very singular character—capsules reaching as much as ·00259″ in diameter, densely packed with nuclei about of $\frac{1}{4300}$″ diameter, resulting from repeated multiplication of the nucleus. (Pl. 4, Fig. 2.)

Case II.—*Large Anterior and Ciliary Staphyloma; wrinkling of Hyaloidea and Hyperplasia of its Cells.*

The following case so closely resembles the last that I shall not quote it at length:—

Arthur Battersea, æt. 9, was admitted into the Royal London Ophthalmic Hospital September 20, 1861, with a very large anterior and ciliary staphyloma. The lids could only be closed by an effort, and the eye was often painful and red. I enucleated it for the same reasons as in the last case. Its antero-posterior diameter was 14½‴, and its transverse 12‴. The centre of the vitreous space was filled by fluid containing floating films which were portions of structureless membrane wrinkled and coarcted by fibres which were clearly products of the hyaloid cells. The minute appearances are shown in Pl. 4, Figs. 4 and 5. In some sections the membrane was perforated by definite circular apertures, the formation of which I was unable to trace out. Possibly they were vacuities left after the dehiscence or disintegration of brood capsules.

Case III.—*Remarkable Fibrillation of the Corpuscles of the Hyaloid Septa of the Vitreous Humour, in connection with Traumatic Ophthalmitis producing Sympathetic Inflammation of the other Eye.*

W. L., æt. 21, pricked his right eye with a packing needle. It inflamed and shrank, and excited reflex ophthalmitis in the left eye. A few days after the injury Mr. Wordsworth, in my absence, admitted him into the hospital with brain symptoms, the presence of which led him to defer enucleation. On my return, as these threatening symptoms had disappeared, and the obscuration of the left eye progressed, I excised the right, nine weeks after injury. At this time the right globe was slightly shrunken and soft. The pupil was closed, and entangled in the

wound. Qt. p.l. = O; and there was redness and pain. The left eye was also red and painful. Its pupil was muddy, and excluded; its fundus could not be illuminated; its visual acuity was reduced to counting fingers at a few inches distance. Its condition improved considerably after the removal of the right eye.

*Dissection.*—The cornea was marked by a slightly prominent trifid scar, which, at the temporal side, ran into the ciliary region. The thickness of the cornea was much increased. Its corpuscles were swollen, and crammed with granulation cells; its inter-corpuscular tissue was clouded with fine molecular matter, and it was traversed by numerous blood-vessels. The posterior elastic lamina was detached about the inner lips of the wound, and much involuted. Its epithelium was swollen; the cells in some places proliferous, in others forming sterile vesicles. The anterior elastic lamina at the outer lips of the wound overlapped.

The cornea, the pupillary margin of the iris, and anterior lens capsule, were united by scar tissue. The lens was flattened by pressure against the cornea; its cortex was softened, and the nucleus lay excentrically upon the posterior capsule.

The retina around the optic nerve, and at the nasal side as far as the ora, was separated from the choroid, and pressed against the lens by a finely fibrillated coagulum an exudation from the choroid. Vertical sections showed increased thickness. All its layers were distinctly recognizable, but their details were somewhat obscured by a finely granulated interstitial substance. The ciliary body and choroid were swollen, their vessels dilated and crowded with blood discs, their parenchyma infiltrated with albuminous exudation, a stratum of which $\frac{1}{2}'''$ thick filled the meshes of the lamina fusca intervening between the outer vascular layer and the sclera. The elastic lamina was wrinkled, and projected in small folds beyond the plane of the choriocapillaris. The epithelium was charged with dark pigment, and but little disorganized. The vitreous humour presented the following very singular appearances, the definite character of which was most remarkable, and may have some reference to its normal structure. They were most marked at the temporal side, that in which the wound extended into the ciliary region, opposite to the greatest convexity of the detached retina. Sections

of the vitreous vertical to the surface of the retina displayed under a low magnifying power alternating dark and light bands, resting perpendicularly on the retina. (Pl. 4, Fig. 6.) The dark bands exhibited a fine striation at right angles to their length, and numerous opaque dots, which were chiefly clustered along the lines of junction with the light bands. Under $\frac{1}{4}$ object glass these dots resolved themselves into nucleated corpuscles, and the transverse striation into fibres derived from them. (Pl. 5, Fig. 7.) In other parts the fibrillation was irregular, and formed a tangled web without definite plan of arrangement, on the outskirts of which isolated fibrillating corpuscles were observated upon plaited structureless membranes. (Pl. 5, Fig. 8.)

In this case we have a penetrating wound of the cornea and ciliary region, exciting inflammation in the cornea, iris, and choroid, which extended to the vitreous humour, producing in it a very singular morbid structure. Respecting the exact nature of the relation which this change in the vitreous bore to the retinal detachment, I am not prepared to speak definitely; its maximum development opposite the greatest displacement of the retina, and the vertical disposition of the pale bands to its surface would consist with traction upon the inner surface of the retina; but we cannot overlook the fact that there was complete detachment around the optic nerve where the vitreous did not exhibit structural alterations in so marked a degree.

Case IV.—*Choroido-iritis—Detachment of the Retina—Hemorrhage into the Canal of Petit and the Vitreous Humour from the Ciliary Processes—Evolution of Fibrillated Webs from the Hyaloid Corpuscles.*

Nov. 2nd, 1857. An eye was given me by Mr. Bowman, who had just previously excised it on account of chronic neuralgia and frequently recurring inflammation. The patient was a lady æt. 21. It was about half the natural size, and squared by the pressure of the recti muscles. The pupil was obstructed by a buff-coloured false-membrane. The retina was separated

from the choroid in its entire extent from the optic nerve to the ora, and loosely folded. It was opaque and pervaded by a molecular substance which greatly obscured the finer structure, yet in some places this could be made out. The choroid was œdematous, particularly its lamina fusca. The vitreous humour had a yellow tinge and firm consistence. In the ciliary region it contained numerous films which converged from the ciliary body towards the back of the lens, nearly reaching the axis of this, and overlaying and thickening considerably the posterior, hyaloid wall of the canal of Petit; the canal itself was filled with disintegrating blood discs, masses of orange pigment, and cholesterine. The films consisted of a fibrillated web (similar to that formed in coagulated fibrine) containing withering blood-discs, masses of hæmatine, and granulation corpuscles. Besides these there were the corpuscles of very varied figure, sending off stout fibres which coalesced with those of neighbouring corpuscles and formed a very irregular net upon structureless membrane. Pl. 5, Fig. 9.

### Case V.—*Traumatic Ophthalmitis.*

July 28, 1857. This eye was given me by Mr. Hutchinson, who removed it for Mr. Critchett at R.L.O.H., for panophthalmia and reflex inflammation of the other eye. It had been pierced three weeks before with a file, and punctured with an extraction knife about 3‴ behind the sclero-corneal junction, for the purpose of relieving tension, and evacuating pus one week before enucleation.

The cornea was opaque, swollen, soft, and sloughing centrally. The iris was pressed against the back of the cornea to the complete obliteration of the anterior chamber, and the lens, greatly diminished and flattened, was thrust forwards against the uveal surface of the iris by the swollen vitreous humour. The choroid was very thick and succulent from œdema and the presence of granulation corpuscles. The retina was opaque and thick and its finer structure was not recognisable.

The sclerotic lips of the incision were depressed and involuted and adhered intimately to the choroid and retina. The vitreous humour was tough and yellow, the tenacity and tint diminished centrad, and at the centre there was a cavity of the size of a

pea filled with a straw-coloured nearly clear albuminous fluid. At the temporal side, at the equator, the altered vitreous humour was continuous through the incision in the ocular coats with a subglobular mass having the same rough characters lying in the outer surface of the sclerotic. These morbid changes in its colour and consistence depended on the presence of fibrillæ, and the development of granulation corpuscles which were most numerous in the superficial parts and decreased in number towards the centre. Fig. 10. Their evolution was traced to the hyaloid cells which became enlarged and proliferous by fission of the nucleus. Fig. 11.

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## EXPLANATION OF PLATES 4 AND 5, EXCEPTING FIG. 6.

FIG. 1.—Nucleated cells upon structureless membrane. Hyaloid cells. All are × 240.

FIG. 2.—A portion of a band-like fibre floating in the vitreous humour, exhibiting structureless membrane, hyaloid cells, strong parallel fibres evolved from them, and brood capsules.

FIG. 3.—Structureless membrane with hyaloid cells overlaid by a fibre-net.

FIGS. 4 and 5.—Plaited and wrinkled structureless membrane overrun by a net of fibres developed from the hyaloid cells.

FIG. 6.—Vertical section of the retina and vitreous humour × 20. The vitreous humour exhibits alternating, dark and light bands perpendicular to the surface of the retina. The dark bands display a transverse striation and opaque dots.

FIG. 7.—A portion one of the dark bands, shewing fibrillating hyaloid cells.

FIG. 8.—Irregular fibre-web produced by fibrillation of the hyaloid cells.

FIG. 9.—Fibrillating corpuscles on plaited structureless membrane.

FIG. 10.—Granulation cells produced by proliferating hyaloid cells.

FIG. 11.—Proliferating hyaloid cells.

Fig 1

Fig. 2.

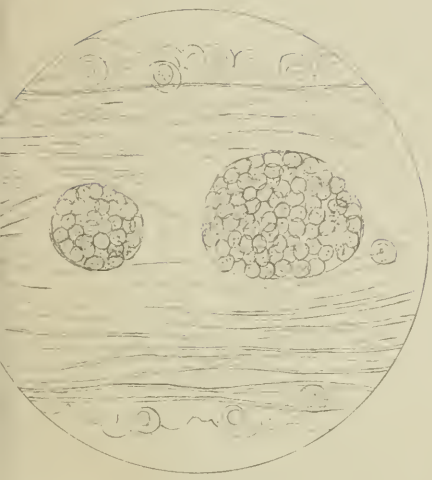


Fig 3.

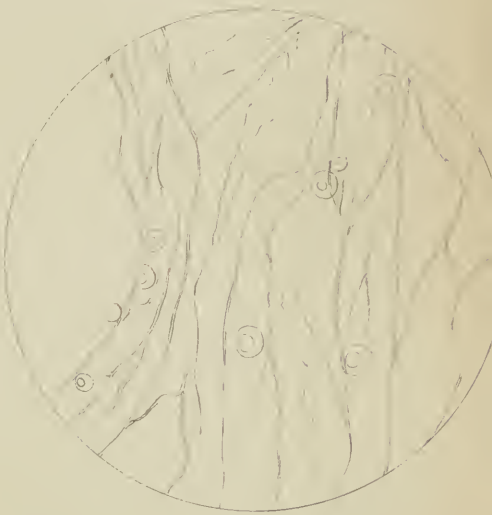


Fig. 4.

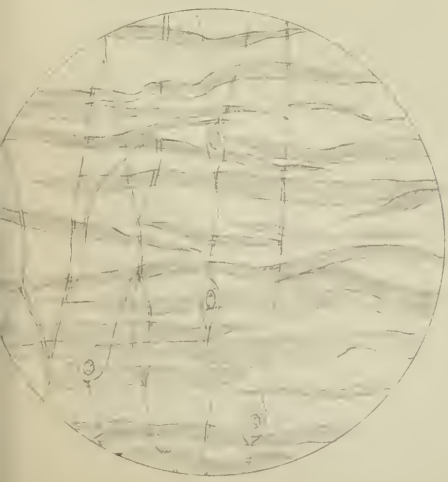


Fig. 5.

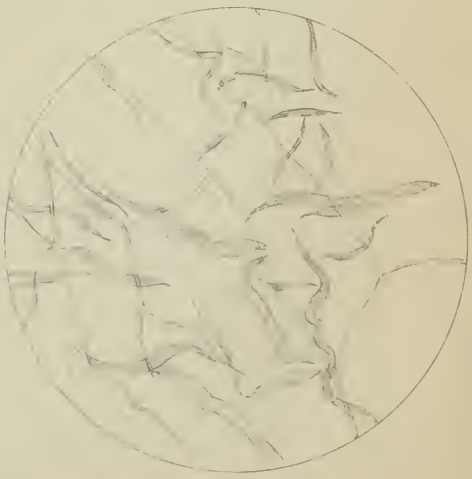


Fig. 6.

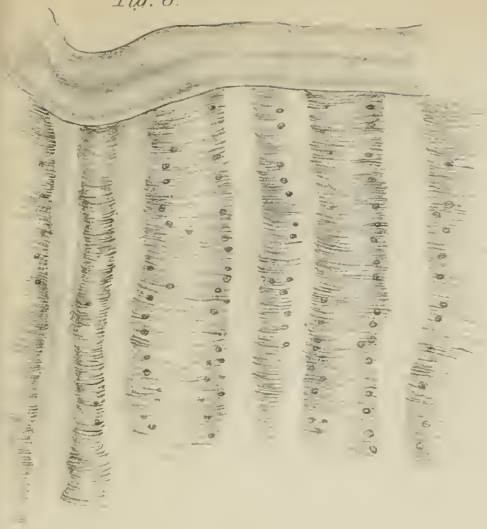


Fig. 7.

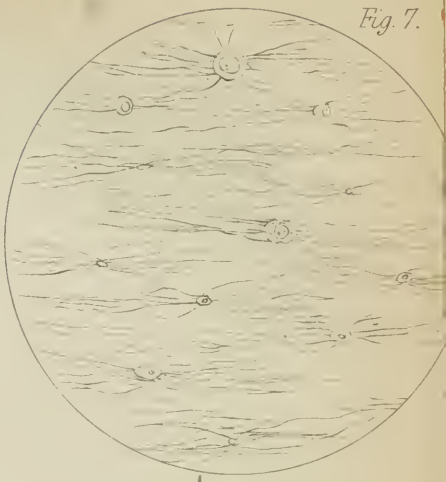


Fig. 8.

Fig. 9.

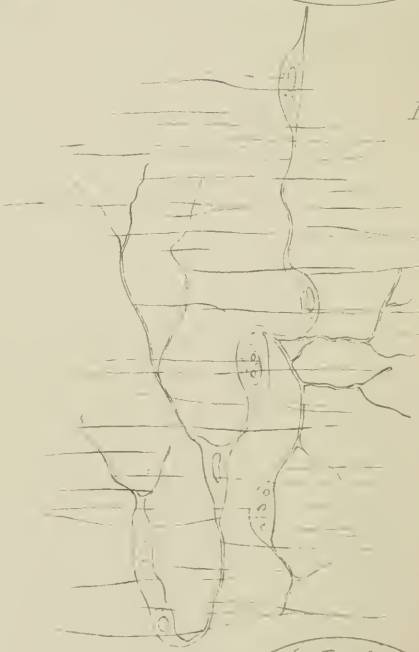


Fig. 10.

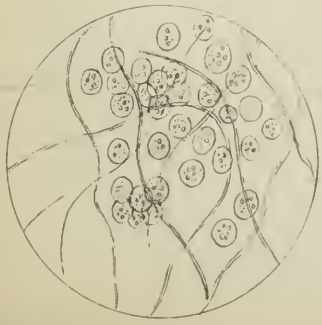
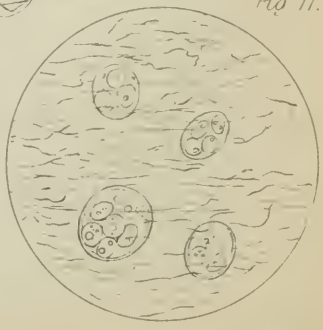


Fig. 11.



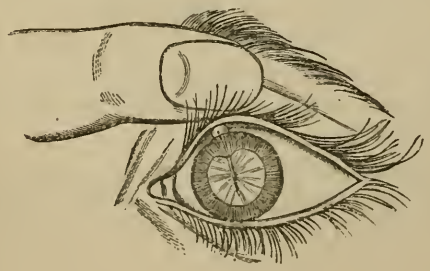
## TWO CASES OF TRAUMATIC CATARACT POSSESSING SOME INTERESTING POINTS OF DIAGNOSIS.

By George Cowell,

*Clinical Assistant at the Royal London Ophthalmic Hospital, Surgeon to the St. George's and St. James' Dispensary.*

From the history which may be nearly always obtained in connection with cases of traumatic cataract, error of diagnosis is rendered almost impossible, and in consequence cases of this kind present but little of interest to be worth recording. In the two following, however, there are certain points which are not altogether devoid of interest, points, not throwing any doubt upon the existence of cataract, which was in both most evident, but of detail relating solely to the individuality of the cases themselves.

Clara S., a healthy girl, 12 years of age, was admitted as an out-patient at the hospital, on October 16th, 1865, with traumatic cataract of the left eye. Eleven weeks ago, whilst *running* in a corn field, she fell down, and "something ran into the eye," making a wound in the sclerotic, just above the margin of the cornea. When she presented herself, there was a small staphylomatous-looking cicatrix in the position of the wound in the sclerotic; the lens was white and opaque, the track of the wound in it was



distinctly seen as a tube of whiter opacity than the surrounding cataract, and extending downwards, and slightly outwards, and at the bottom of the wound was a dark and apparently rounded body: this could only be entirely seen when the pupil was fully dilated with atropine. There was no inflammation, and the patient had good perception of light with the injured eye. The only point of uncertainty here was the nature of the dark mass at the bottom of the lens wound. That it was some foreign body introduced into the lens at the time of the accident was favoured by the form of the track leading to it, and also by its form, for, besides length and breadth, there was that third quality of depth unmistakeably apparent: that there was uvea present was proved by the presence of one or two minute particles left in the track of the wound, and by a slight irregularity at the margin of the iris opposite to it, where it was adherent to the lens, a projecting point on either side presenting the appearance of uvea having been torn away in the direction of the wound. The quiet state of the eye may also be mentioned, although, perhaps, not of much weight, as bearing against the presence of a foreign body. On October 26th the whole of the cataract was removed by Mr. Streatfeild, by means of the syringe, having previously freely opened the anterior capsule and broken up the lens matter with a broad needle. The dark mass was removed, mixed up with the lens matter, and was found to consist entirely of uvea.

Its previous resemblance to a foreign body was curious, and must be explained by supposing that the point of grass stubble, or whatever may have caused the wound, carried before it a sheath of uvea from the back of the iris, and had been withdrawn leaving the sheath 'in situ' at the bottom of the wound.

It will perhaps be interesting to record the termination of the case as a successful one of extraction with the syringe.

December 7. The eye was free from redness, and the pupil acted well. In the position of the posterior capsule, remains of opacity could be seen, especially by oblique illumination. This was freely opened out by means of two needles, but a denser opaque narrow band across the pupil would not give way, although twisted several times by one needle round the other. It was therefore, for the present, left.

December 11. The eye being free from inflammation Mr. Streatfeild introduced the canula scissors, and the opaque narrow band was divided easily.

December 14. The eye was doing well. The pupil (dilated with atropine) was free and clear at the centre.

February 12, 1866. She could read No. 1 (Snellen) with + 2, No. 40 at 20 feet with + 3. Her acuteness of vision was therefore = $\frac{1}{2}$.

James H. B., æt. 4, was brought to the hospital October, 23, 1865, with traumatic cataract of the right eye. Whilst playing with a needle, 17 days before, the boy hurt his eye with it, although it was not supposed at the time to have made any wound, as none could be seen. The eye had been "weak and watery" with some pain, all of which had then entirely disappeared. On examination a very small cicatrix was observed near the centre of the cornea, the lens was opaque, the right half bulging forwards in a plane

anterior to the left, the line of boundary between the two portions being perfectly straight.

In this case the traumatic origin of the cataract was at first denied, and it was only on the discovery of the minute cicatrix in the cornea, that the history of the accident with the needle was elicited. The appearance of the cataract was unusual, and was probably caused by a cut having

been made in the anterior capsule by a rapid movement of the point of the needle. The straight line mentioned was probably where the prolapse of the lens matter was restrained by the inner margin of the wound, and it is curious that, subsequently to the wound the whole capsule was not ruptured by the swelling of the lens-matter. The outer half of the cataract was regularly rounded and prominent in the pupil, whilst the inner portion was far behind the pupil and less distinctly opaque, so that it might almost have been supposed that the rounded outer half of the cataract, represented all that could be seen of an opaque lens, which at the time of the injury had been displaced outwards. But this, among other reasons, was particularly contradicted by the straightness of the line of boundary of this prominent portion in the pupillary area. There was no irritation in the eye and no operation was done. At subsequent visits the prominent half of the cataract appeared to be diminishing rapidly in size, and when last seen the two portions of the lens were as nearly as possible in the same plane, and a white band was seen occupying the position of the straight boundary line above-mentioned.

My thanks are due to Mr. Streatfeild for the drawings illustrating these cases.

## CLINICAL NOTES ON PARALYSIS OF THE OCULAR BRANCHES OF THE CERVICAL SYMPATHETIC NERVE.

By Jonathan Hutchinson.

But little has as yet been recorded in reference to the effects of paralysis of the cervical sympathetic nerve upon the function of the sight. Physiologists (Professor Bernard, Dr. Brown-Séquard, and Dr. Waller) have, by experiments, fully established the fact that paralysis of the radiating fibres of the iris ensues in connection with paralysis of the vaso-motor nerve (cervical sympathetic), and a certain number of cases are on record in which it has occurred as a symptom caused by aneurisms or other tumours in the neck. It has as yet, however, received but little notice from writers on diseases of the eye, and I am not aware of any records as to its effects on vision, excepting a brief notice in Professor Donders' work. (See pages 579 and 627; New Sydenham Society's Edition.)

The following is an enumeration of the chief symptoms which attend paralysis of this nerve :—

1. Contraction of the pupil. [The myosis even in a young person is not of such degree as to attract attention. The pupil is of the size which it would naturally be in a good light.]
2. Immobility of the pupil. [This is almost absolute. The pupil neither dilates when shaded, nor contracts much further when exposed to light.]
3. Retraction of the globe in the orbit.
4. Narrowing of the palpebral aperture.
5. Alteration (increase) of temperature in the parts affected.
6. Dilatation of arteries.
7. A slight difficulty in vision observed by the patient,

both for near and distant objects, and especially when the light is bad.

The cases which have come under my observation have been very various in respect to their cause and complication. Sometimes it is met with as the only symptom of disease of the nervous system present, at others I have found it in conjunction with paralysis of one or several of the cranial nerves, more especially the third, fifth, or sixth. In other cases it occurs from injuries to the spinal cord, or to the roots of the brachial plexus. The symptoms present vary considerably in connection with one or other of these complications. Thus, if there be paralysis of the third nerve at the same time, the pupil will not be contracted, but will be absolutely motionless in a state of moderate dilatation.

Cases of paralysis of the radiating fibres of the iris are, I feel certain, frequently overlooked, owing to our habitually examining our patients in a good light. When well exposed to light the pupil of the sound eye contracts to the same size as that of the other, and there is no difference to be observed. It is only when the patient is taken into the shade, and the pupil of the sound eye dilates widely, whilst that of the other remains contracted as before, that our attention is arrested. If we see our patient for the first time in a dull light the suspicion which crosses the mind first is certain to be that we have to do with a case of paralysis of the third nerve, and mydriasis as the result, but on bringing him to the light we find the supposed mydriasis disappear. I have several times made the two mistakes to which I refer, and have seen them made also by others.

Inequality in the size of the pupils, the smaller one being the fixed one, is then the cardinal symptom of paralysis of the sympathetic, just as inequality of pupils with the larger one fixed is the cardinal symptom of paralysis of the third, as far as the supply to the iris is concerned.

Several patients have at different times been under my care, who presented almost precisely similar conditions to those detailed in the following case:—

### PARALYTIC MYOSIS WITHOUT COMPLICATIONS.

CASE I.—*Paralysis of Radiating Fibres of the Iris without known cause, and without other complications.*

P. N. Craigie, a clerk, aged 34, apparently in good health, came to the hospital on November 16, complaining of some defect in sight in his left eye. He considered that this eye had been failing for two months, and stated that when he worked his eyes the left became painful and misty. He had been engaged on drawing plans, and had had great difficulty in seeing the lines correctly. It was a dull, foggy morning when this patient first came to my desk, and I noticed directly that his right pupil was three times the size of the left. There was, however, no squint, and no ptosis, and he persisted that it was his left eye which was defective. We took him to a strong light, and his right pupil at once contracted to the same size as the other. We next examined his vision.

With the *left* eye at 20′ he could read Snellen's xxx, and he could read brilliant (with some difficulty) at 12″, but not either nearer or further off.

With the right eye he read at 20′ Snellen's xx, and he read brilliant easily at from 8″ to 14″.

Thus there did not appear to be any great difference in the power of reading either at near or long distances between the two eyes, but he used the left eye with more difficulty than the other, and was longer in fixing the object.

With the ophthalmoscope nothing abnormal in either eye could be detected. There was no appreciable difference in the size of the retinal arteries, but as atropine had been used a source of fallacy on this point was introduced. The left pupil had dilated well with atropine. With + 40 he read Snellen's xx easily at 20′, and with + 10 he read brilliant easily at from 8″ to 10″. It is probable, therefore, that his left eye is somewhat hypermetropic.

At a later date (November 27), ten days after the atropine, and its effect not quite passed off as regards the pupil, he could read better than before brilliant at from 8″ to 10″, and Snellen's xx at 20′, without any glass. Still he averred that he could not use the left eye so readily or so quickly as the other.

I could not arrive at any satisfactory opinion as to the cause of the paralysis in this case. There was no history of syphilis, and no other nerve symptom. The man appeared to be in good health. I prescribed iodide of potassium, with vegetable bitters and nux vomica. He is still in attendance, and the symptoms are almost precisely as before, excepting that the eye is less irritable. The pupil is still small and fixed. In this case I cannot make out any difference in the temperature of the two sides of the face or the ears, nor has the patient noticed anything peculiar as to the effect of alcoholic stimulants. Thus there was no proof that any other part of the sympathetic is involved, excepting that which supplies the radiating fibres of the iris.

The converse of this class of cases is met with in paralytic mydriasis without other complications. Mydriasis without other symptoms of impairment of the third nerve is rare, but good examples do occasionally happen. I have now under observation in the London Hospital an instance of it. The man has neither strabismus, diplopia, ptosis nor paralysis of accommodation, but simply wide dilatation of one pupil. Mr. Dixon has at present a young woman attending his clinic at Moorfields with a precisely similar state of things.

In the case of Craigie, above related, I have tried the effects of Calabar bean, and, as expected, found that it contracted the myotic pupil very greatly. Under its influence the pupil was reduced to the size of a pin's head, thus affording proof that in spasmodic myosis the contraction is far greater than in the paralytic form.

### PARALYTIC MYOSIS FROM INJURIES TO THE SPINAL CORD.

Of paralysis of the sympathetic, in connection with injuries to the cervical part of the spinal cord, I might mention several cases. The symptom occurs in both eyes in all instances of fracture of the cervical vertebra with crushing of the cord, and in these we have also the symptom of increased heat of the patient's ears. In other more rare cases only one-half of the cord is injured, and only one pupil becomes fixed.

Case II.—A patient was under the care of my colleague, Mr. Maunder, some years ago in whom this had happened, in consequence of a stab with a knife. All the symptoms of section of one part of the spinal cord were present, and amongst them myosis and retracted globe. This patient recovered and is, I believe, still living, and still displays the condition of the eye referred to.

Case III. — A boy was under the care of my colleague, Dr. Frazer, about a year ago, whose neck had been trod on. His left pupil was much larger than the right, especially in the shade, the right pupil did act, but only to a limited extent. His right ear was two degrees higher in temperature than the left, when exposed to a full light the pupils were almost of the same size, but in the shade the left dilated until more than twice the size of the other. The boy also had paralysis of some of his extremities. His symptoms illustrated in a most interesting manner some of the views of Dr. Brown-Séquard, as regards the physiology of the spinal cord.

### PARALYTIC MYOSIS FROM INJURIES TO THE NERVE-ROOTS IN THE CERVICAL REGION.

In another group of cases we have this symptom in connection with injury to the chief branches of the cervical sympathetic after they have emerged from the spinal canal.

We meet every now and then with cases in which after

a violent blow on one shoulder, with perhaps fracture of the clavicle, the patient becomes completely and permanently paralytic in the whole of one upper extremity. The hypothesis, in explanation of this, is that the nerve-roots constituting the Brachial Plexus have been torn through, and with them the roots of the cervical sympathetic, which it is well-known come out in the lower cervical and upper dorsal region.

I am aquainted with three or four examples of this state of things. If the eye be examined in such a case the symptoms of paralysis of the sympathetic will be found, and their presence tends in a very conclusive manner to support the diagnosis as to laceration of the nerve-roots. The knowledge of the true nature of this symptom is in these instances of the utmost value in enabling us to diagnose between injury to the brain and injury to the nerve-trunks. I will relate only one case of this class. It is that of the man whose stereoscopic portrait is now before us. [This paper was read at a meeting of the Moorfields Club. The portrait shown exhibited the narrowed palpebral aperture and the retracted globe very definitely. I have duplicates and shall be happy to send one to any gentleman interested in the subject.]

Case IV.—*Fall from a height, striking the Head and Shoulders against Poles of Scaffolding—Concussion of Brain—Recovery from Concussion in a few days—Permanent Paralysis of the Left Upper Extremity, both as to Motion and Sensation—Tract of Skin supplied by the Intercosto-Humeral, not affected—Paralysis of Cervical Sympathetic with Contracted Pupil and Retracted Globe—Sight almost Perfect—No Congestion of the Globe.*

A very healthy man, aged 42, was admitted under my care at the London Hospital, on account of paralysis of the left arm consequent on injury. His arm hung useless by his side, and all its muscles were much wasted and flabby. The wasting of the muscles was especially evident at the shoulder-joint where the complete atrophy of the deltoid allowed the acromium to project

and left a remarkable hollow below it. The head of the humerus hung very low, and, at first sight, the idea of dislocation into the axilla suggested itself, but this was soon corrected by the observation that the deltoid did not stand out, and that the axis of the humerus was quite straight and parallel with the chest.

He gave me the following particulars of his accident; which had happened five months ago. It occurred in a fall from some scaffolding: the whole height being sixty feet, but the fall being broken several times by striking against the projecting beams of wood. He was taken up quite insensible and carried to the Poplar Hospital. Those who saw him fall told him afterwards that his arm and neck were both very much twisted. He believes that he was insensible,* more or less, for two days afterwards, but on the Friday following (the accident was on a Tuesday) he was so far recovered that he left the hospital at his own wish and walked home, a distance of three-quarters of a mile. As far as he is aware he never had any difficulty with his urine or fæces, nor had he the slightest impairment of either lower extremity. His intellect, memory, and special senses have all been quite perfect since the accident, and were so as soon as he had fairly recovered from the first stunning. When he left the hospital his whole arm was very much swollen and very painful, and when he got home he had "erysipelas and abscesses" in it. There is a large scar in the front of his elbow where the abscess opened. Although he complains of having suffered much pain in the arm, during the attack of inflammation, yet he avers that it has been quite paralysed as at present, as regards both motion and ordinary sensation from the day of the accident. During the first fortnight he was at home he had poultices applied to his neck because it was stiff and painful, but he suffered nothing whatever in his head. He was assured by the surgeons who attended him that he had no broken bones. In spite of persevering treatment, by electricity and other measures, he has not made the slightest improvement.

*Present State.*—(five months after the injury). In excellent

* This was afterwards contradicted by the house surgeon of the Poplar hospital who informed me that the man never was insensible, not even at the time of his admission. I was further made aquainted of an interesting fact corroborative of the diagnosis I have given—that his shirt was found torn transversely across over the injured shoulder, near to the neck.

general health and every function perfect excepting those concerning the innervation of his left arm. He has not the slightest power of motion in this limb. The contour of most of the large muscles can be made out, but they are all greatly diminished in size. He cannot use his pectoral muscles, nor the *latissimus dorsi*, and these muscles are decidedly wasted. The *trapezius* and *levator anguli scapulæ* seem in good condition. The *rhomboidei*, and *supra-*, and *infra-spinati* are, on the contrary, powerless. All the motions of his head are perfect and easily performed. No difference can be detected in fulness on two sides of his neck, with the exception that there is on the left side a decided hollow between the three upper dorsal vertebræ and the scapula.

*Sensation.*—Below the elbow he has not the slightest degree of cutaneous sensibility, and can permit deep pricking without knowing it. On the outer, front and posterior aspects of the upper arm the loss of sensibility is also complete. In the axilla sensation seems perfect, and from the axilla downwards to the inner condyle he can also feel well. Over the shoulder-joint above and in front, sensation is lost, but he can feel well, behind it and across to the spine from the infra-spinous fossa. Over the supra-spinous fossa he cannot feel in its outer half and the line of commencing sensibility at about the mid-distance from top of shoulder to spine is very abrupt. Wherever he has sensation at all it seems as perfect as in corresponding regions of the opposite side, and very often the abruptness of the line where it commences is remarkable.

*Temperature. Subjective.*—He is aware that the paralysed arm is a little colder than the other, but in the night he says it is often hot and burning. *Objective.* The hand, forearm, and upper arm are all decidedly cooler than the other and in about equal degree; at the shoulders no difference in heat can be detected. The thermometer confirmed these impressions.

| | | | |
|---|---|---|---|
| Front of shoulder joint .... | right 91° | left 89° | difference 2° |
| Above elbow joint (outer side) .. | 88° | „ 83° | „ 5° |
| Below elbow (inner side) ..... | 88° | „ 84° | „ 4° |
| Cleft between middle and forefinger | 88° | „ 83° | „ 5° |

The capillaries of the skin are evidently much relaxed, and the skin is brick-dust red, neither florid nor livid; somewhat

mottled. When emptied by pressure the capillaries refill slowly. The appearance of wasting of the limb would, I think, be very much greater were it not that the skin is thick and turgid with blood. It does not actually pit, but there is a tendency to œdema in a slight degree. Under galvanic excitement the muscles did not act at all.

His pupils in a bright light are of equal and normal size.

In this case, excepting evidence of concussion persisting for two days after the accident, we have nothing in the least denoting cerebral lesion. The paralysis is of the parts supplied by the brachial plexus and by the cervical sympathetic and of those only. The escape of the intercosto-humeral nerve is clearly proved by the sensibility of the integument supplied by it. Then we must note that the paralysis is most complete, and keeping clearly in mind its completeness in degree and abrupt limitation as to extent, we can, I think, come to no other conclusion, than that the nerve trunks, or rather both their sensitive and motor roots, have been injured (torn across), and that the lesion is not central.

Sept. 16, 1863. His condition is much the same as heretofore, except that the arm is thinner. This thinning seems to be more from the absorption of œdematous cellular tissue than direct muscular wasting. The hand is still somewhat œdematous. The anæsthesia and loss of motion are still absolute. Temperature much as before, *i.e.*, decidedly below that of the other. The back and outside of the elbow feels much colder than any other part. During the last few months I have on many occasions tried the temperature of his ears, and have always found the left slightly but very positively cooler than the other. This evening three observers were all unanimous in their impressions in this point. I carefully examined his chest, and there is, I think, no doubt that the serratus magnus on the left side is quite atrophic. His trapezius and levator angulæ scap. are in good condition.

*Eye.*—The left eyeball looks smaller than the other, being retracted, and the palpebral aperture diminished. He says that the sight has improved of late, but considers it still not quite so good in this eye as the other. On trial, however, first in a strong

light and then in a duller one, we found that he could see about equally well with each. The left pupil is much smaller than the other and does not dilate materially in the shade; it does, however, act somewhat, more especially it contracts when exposed to a very bright light. It dilated well with atropine. The fundus was normal. In good light he can read equally well with either eye; he considers the left a little dim. With the ophthalmoscope we could not discover any alteration in the size of the retinal arteries.

Nov. 23, 1863. The arm remains in the same state. It is much cooler than the other. The capillary circulation is most feeble. On pressing a portion of skin until it is pale, two or three minutes are required for it to regain its colour. The finger-nails and the thumb-nail especially are becoming curved, and the finger-ends clubbed,—an interesting additional proof that this symptom is produced simply by retarded circulation. The finger-ends of the sound hand contrast most markedly with those of the paralysed one.

We must bear in mind that the vaso-motor nerve of the left internal carotid is probably paralysed. In a former note I have mentioned what he stated as regards the influence of stimulants. This condition of susceptibility still continues, a small quantity of beer, especially on an empty stomach, at once disturbs his head and makes him confused. He also frequently suffers from giddiness.

Before the accident he never felt giddy; now he has an attack once every two or three weeks, and often it lasts for some time —ten minutes or more. The usual time is on rising from bed. All the things in the room appear to be going round, and he is obliged to cling to the nearest support for fear of falling. He finds that to stand up or to walk about, taking firm hold of the furniture, &c., is the best plan to get rid of it. Probably we have here an interesting illustration of the cause of one form of vertigo, the inability on the part of a tract of the vaso-motor nerve to regulate the calibre of the cerebral-arteries, and thus control the supply of blood to a certain portion of the brain.

In this class of cases, as the whole cervical sympathetic is involved, there is alteration of blood supply from paralysis of arteries; the ear on the affected side becomes hotter

(at any rate at first) and the patient is remarkably prone to suffer cerebral inconvenience from small quantities of stimulants.

It is an interesting fact that in none of the cases which I have seen was the conjunctiva of the eye congested. Nor, in any one, did the slightest evidence of derangement of the nutrition of the eyeball ensue. The ear was the only part of the involved half of the head in which we could prove any alteration of temperature, or of vascular supply.

### MYOSIS IN ASSOCIATION WITH PARALYSIS NOT ONLY OF THE SYMPATHETIC BUT OF OTHER CRANIAL NERVES.

This may occur either in connection with cerebral tumours, with arachnitis, with syphilitic disease, or after injuries to the head. A very remarkable case is at present in the London Hospital under Mr. Curling's care. (Case V.) A man was admitted, after a fall on his head, with symptoms raising a suspicion of fracture of the base of the skull. A few days after his admission he became much worse, and both his facial nerves were involved in partial paralysis. One pupil became much larger than the other. It was at first supposed that on the side in which the pupil was dilated the third nerve was paralysed, but on bringing a light before him we found that the large pupil contracted until both were of the same size. Inability, on the part of the smaller pupil, to dilate was the real symptom, and no doubt it indicated paralysis of the vaso-moter fibres. I am indebted to Mr. Dove, one of our house-surgeons, for calling my attention to this interesting case. The man is now recovering.

CASE VI.—*Paralytic Myosis, with Paralysis of fifth and other Cranial Nerves—Suspected Syphilis—Improvement.*

Mrs. Long, æt. 26, a fairly healthy-looking Irish woman, but rather pale, is married, has one child a year old, who is still at

the breast. There were two born previously, one died at the age of three months, the other at the age of two years and three months. She states that she had good health till about fifteen months ago, when she began to suffer from severe pain in the right shoulder. About three months later the pain left the shoulder and settled in her right cheek. She points out a spot an inch below the middle of the zygoma, as the exact seat of the most severe pain, and also another spot about an inch above the zygoma, where it was very bad, but it has passed more or less over the whole of the cheek. This pain has been of a shooting and stabbing character, sometimes very severe, indeed, often keeping her awake all night. Occasionally it would intermit for a week or two, or even for a month at a time. She considers that almost from the time the pain commenced she has felt numb in the whole of the right cheek, the right halves of the upper and lower lips, and right side of nose. She is very accurate in describing this numbness, and in limiting its extent. She has never had either pain or numbness on the left side. She cannot feel well on the inside of the right cheek. On examining her with the æsthesiometer, I could detect very little difference in the two sides. She complained much of double vision. The right eye converges to a considerable degree.

April 14th, 1863. *Ophthalmoscopic Examination, &c.* The fundus is quite normal. The right pupil is not more than half the size of the left (normal in size), and is fixed or nearly so. The left pupil is decidedly sluggish. She cannot turn the right eye outwards, but all other movements seem perfect. All movements of the left eye are perfect.

To the touch, I thought the right side of the head, temple, ear, cheek, &c., decidedly a little hotter than the other, but we could not demonstrate this with the thermometer. The right globe also looks a little drawn back into the orbit. The temperature of the inside of the right cheek was $98\frac{1}{2}°$, that of the left, $98\frac{1}{2}°$; of the inside of the right eyelid, 99°; that of the left, 99°; that of the right temple, $93\frac{1}{2}°$; that of the left, 95°.

I suspected a syphilitic cause, and ordered full doses of iodide of potassium.

May 28th.—The right pupil is still contracted, and does not dilate in the shade. The globe is very decidedly retracted, and the palpebral aperture is smaller than that of the other. She states

that she can see the smallest letters with this eye. There is no double vision, and the convergence is now but very slight. She thinks the numbness is not quite so great as it was. She can now carry the right eye well outwards, the paralysis of the sixth nerve having apparently quite disappeared. She considers herself much better, can eat better, and has had no pain for weeks. The right temporal muscle was shrunken and quite atrophied when she first came, and is so now to a considerable degree. I can just feel that there is a muscle there, and but just. The masseter merely felt less powerful than its fellow, perhaps half its bulk, but was by no means entirely atrophied. I can now detect but little difference. She always eats on the left side. Her tongue is clean. She has had no soreness of the eye, nor the least congestion. The reason she alleges for always eating on the left side is that she cannot feel the food on the other.

### MYOSIS IN CONNECTION WITH AMAUROSIS.

Lastly I have to speak of contracted pupil, as it occurs in conjunction with amaurosis. The old idea of amaurosis, that a dilated fixed pupil was one of its chief signs is now known to be, to a considerable extent, erroneous. In the various diseases of the structures in the fundus productive of blindness, which are roughly grouped under the head "amaurosis," we find the pupil very variously affected. In some, perhaps the majority, when perception of light is lost, the pupil dilates to a considerable extent, and remains quite motionless, in others and in many it remains of normal size, whilst in a few it is even somewhat contracted. In a very few exceptional cases it retains a certain degree of susceptibility to light, in all the others it is motionless. Our knowledge is not as yet sufficiently definite to allow us to assign the reason why mydriasis in one case, and myosis in another, should be present, but there must be some explanation, and the subject is well worth working out.

In most of the other cases of which I have treated the myosis affects one eye only, in these it is symmetrical.

In conclusion I wish to draw attention to the fact that

in paralytic myosis the pupil is never nearly so much contracted as it is in the spasmodic form. Inability to dilate is the characteristic condition rather than decided contraction. Many cases are, I am sure, overlooked, owing to the general impression being that the pupil ought to be very small. If the patient is examined in a good light, there will be no difference between the two eyes. If the contraction be great, spasm must be suspected.

### NOTE ON SPASMODIC CONTRACTION OF THE RADIATING FIBRES OF THE IRIS (SPASMODIC MYDRIASIS).

I have of late been much interested in examining the state of the pupil in different conditions of the circulation, more especially in those of severe shock. Contrary to expectation, I find that in many cases of extreme shock with the most marked collapse, the pupils are not dilated. In a patient whom I saw a fortnight ago, within an hour after a railway engine had crushed three of her limbs, and in whom the extremities were cold and the pulse scarcely perceptible, the pupils were yet decidedly contracted. I believe that by the size of the pupils in these cases we may judge whether the sympathetic nerve is exciting its muscles to spasm, or is so much involved in the general shock that it allows them to relax. Under both conditions the pulse would become small. During a severe rigor there is probably spasm of all the arteries, and to this spasm the phenomena of rigor are directly due. (See Dr. Brown-Séquard's lectures.) Now during rigor I have observed, over and over again, that there is the most extreme mydriasis. The same remark applies to their state during a severe epileptic paroxysm, and in a case of hydrophobia recently under my care, in which the extremities were cold, the pulse scarcely to be felt, the face pale, and the child in a state of the most extreme terror, the pupils were widely dilated.

## BURNS OF THE EYE FROM MOLTEN AND RED-HOT METAL.

By George Lawson, F.R.C.S.,

*Assistant-Surgeon to the Royal London Ophthalmic and the Middlesex Hospitals.*

The following are some of the cases of burns of the eye which have occurred in my out-patient practice at the hospital during the last year. In the first two cases the burns were from molten metal; in the third and fourth from fragments of red-hot iron; yet in each the amount of injury the eyes received was comparatively small, considering the agency by which it was inflicted. One would reasonably expect that if even a small quantity of molten or red-hot metal was brought into contact with the eye, the heat would be so great as either to burn through the conjunctiva and sclerotic, and cause an immediate death of the entire thickness of the external coats of the eye, or else certainly that such a burn would be inflicted that a local superficial slough of the sclerotic would follow, but such is by no means the general rule. In each of the four cases I have related the conjunctiva only was affected, and in each patient the eye recovered, with perfect sight, from the effects of the accident; a slight symblepharon, or a partial union of the lower lid to the globe, or a cicatrix of the conjunctiva of the globe only remained to mark the site of the injury. The copious flow of tears which is instantly excited the moment the hot metal touches the eye rapidly cools it, and to this may be partly attributed the limited action it seems generally to exert on the surface with which it is brought into contact; but it is also probable that, as has been suggested, the hot metal immediately converts the first drop of moisture which meets it into steam, and that a thin film of steam is thus at once interposed between the metal and the surface of the globe,

and by it the action of the hot metal on the eye is considerably retarded.

Case V is a very remarkable one. The burn, which was very severe, was caused by a large triangular piece of red-hot iron becoming wedged between the lids at the inner angle of the eye. The inner third of both lids were so burnt that their vitality was destroyed, and that portion of them became detached as sloughs. The point of the hot metal which rested against the sclerotic caused a slough of the entire thickness of that coat, which became detached, and an aperture of the size of a small pea was made, through which the black choroid could be seen shining. The conjunctiva of the inner third of the globe was completely destroyed, but at no other point than that mentioned was the sclerotic affected. The eye, notwithstanding this severe injury, did not become generally inflamed, and the sight continued good both during and after the separation of the slough of the sclerotic. As far as I could judge, by closely examining the aperture in the sclerotic from day to day, no attempt at closure of the wound was made by that structure. The edges of the aperture did not appear to granulate, but they continued to look sharp and clean, as if the opening had been punched out with a small punch.

The wound was eventually filled in by granulations from the lower lid, which united with those on the surface of the globe, and so gradually closed around the gap, and one granulation could be seen projecting into it.

As cicatrization proceeded, the opening in the sclerotic became completely closed by symblepharon, or union of the lids to the globe, but the eye became so much drawn inwards and fixed that it was rendered comparatively useless, as, excepting at one point, the man had double vision. The eye is now so much inverted that the cicatrix of the lids slightly encroaches upon the pupil. It is quite immoveable, and is permanently stationary at about one line to the inner side of the mesial line of the orbit. In conse-

quence of the contraction of the cicatrix of the lids, he is able to open them only to a limited extent.

On March 6th of this year the patient came to show himself to me, and with that eye he was able to spell words of No. 8 of Jaeger's test-types.

The impairment of sight seemed to be dependent partly on the effort he had to make to open the lids and adjust the eye to the object, causing a flow of tears, which obscured greatly his vision.

CASE I.—*Burn of the Conjunctiva from Molten Lead.*

John V., æt. 37, applied to the hospital on July 21, 1865. He was engaged working on board a ship at the Isle of Dogs, when a plumber, who was employed in a compartment just over his head, dropped some molten lead which he was running into a joint. It fell on his head, but as he suddenly turned his face upwards a small quantity of it ran into the left eye, burning the portion of the conjunctiva of the lower lid and the globe, with which it came in contact. The cornea escaped injury, but on the burnt portion, the epithelium of the conjunctiva was quite destroyed, and its surface was whitened.

The man was ordered to use frequently a lotion of

Glycerine ℥jj
Aquæ ℥vj. ft: lotio,

and to allow a little of it on each application to run into the eye, and to keep the eye covered with a fold of linen wet with the lotion.

In eight days the burnt portion of the conjunctiva separated as a slough, and left a granulating surface, which soon healed. The man recovered with a good eye, but a cicatrix remained which approximated the lower lid a little more closely to the globe than normal. The sight of the eye was unaffected.

CASE II.—*Burn of the Conjunctiva of the Eye and Lid from Molten Iron.*

Edward H. came under my care on March 31, 1865, on account of an accident to the right eye a fortnight previously.

He had just let out the molten iron from the furnace, and was stopping up the aperture with a piece of clay, when some of the fluid metal spirted up, and entered between the lids of the right eye. He immediately went up into the shop, and one of the men removed a piece of iron about the size of half of a grain of wheat. On examining the eye I found two small pieces of iron the size of millet seeds, buried near the caruncle, at the point where the conjunctiva passes from the lid on to the globe. A portion of the mucous membrane of the lower lid, and a small piece of the conjunctiva of the eye was destroyed by sloughing, indicating the parts which were in contact with the molten iron. Beyond this the eye had sustained no damage. The sclerotic coat was not affected by the burn.

The eye perfectly recovered from the injury. The sight was unimpaired; but a small symblepharon was formed, which marked the extent of the injury.

CASE III.—*Burn of the Conjunctiva from the lodgement of a piece a Red-hot Rivet between the Eye and the Lower Lid.*

George S., æt. 30, a boiler-maker, engaged at iron ship building, applied to the hospital on June 26, 1865, on account of an injury he had that morning received to the right eye. Whilst striking a red-hot rivet a fragment of it, about the size of a small pea, flew off, and lodged itself at the inner angle of the eye between the globe and the conjunctiva of the lower lid.

The conjunctiva of the lower lid near the inner angle, and the corresponding portion of the conjunctiva of the globe and the caruncle, the parts with which it had come in contact, were quite white, and the epithelium destroyed. Both the upper and lower lids of that eye were so œdematous that he was unable to open them. A fellow-workman removed the piece of metal immediately after the accident. A copious flow of tears followed the lodgement of the foreign body.

He was ordered to bathe the eyes frequently with a lotion of

Glycerine ℥ii
Aquæ ℥vj. ft: lotio.

and to apply two leeches to the temple.

The man continued his attendance as an out-patient, and in a few days a superficial slough of the burnt parts separated, and

a healthy granulating surface was left, which soon cicatrized. The cicatrix which resulted drew the inner portion of the lower lid rather closer to the eye than normal, but not so much so as to cause the patient any inconvenience. The sight of the eye was unaffected.

CASE IV.—*Burn of the Conjunctiva from the Lodgment of a small Scale of Red Hot-Iron.*

Wm. K., a hammerman, æt. 23, came to the hospital on June 23, 1865. Two days previously, whilst engaged welding some hot iron together, a piece of red-hot metal flew off and lodged itself between the lower lid and the globe of the right eye.

A copious flow of tears immediately followed, and his mate at once removed from the surface of the eye a scale of metal about $\frac{1}{4}$ inch long and $\frac{1}{8}$ of an inch in width, which was lying in contact with the globe and between it and the lower lid, close to the outer canthus.

*On examination of the eye* the conjunctiva was seen chemosed from serous effusion, and the part against which the hot metal had laid was indicated by a white patch, quite denuded of epithelium. The cornea was uninjured. A lotion of—

Glycerine ℥ii

Aquæ ʒvj, was ordered to bathe the eyes with, and two leeches were applied to the temple.

A superficial slough of the conjunctiva after a few days separated, and the part soon cicatrized, and the man recovered with a perfectly sound eye; a small cicatrix of the conjunctiva only remaining to mark the site of the injury.

CASE V.—*Severe burn of the Eye and both Eyelids, involving both the External and Conjunctival Surfaces of the Lids—Slough of the Sclerotic and afterwards Closure of the Aperture in the Globe by union of the Sclerotic with the Granulating Wound of the Lower Eyelid.*

James S., æt. 21, a rivetter, came to the hospital on December 19th, 1865, on account of an injury he had two days previously received to the left eye. He was striking a red-hot rivet, when a triangular piece of it, about $\frac{3}{4}$ of an inch in length and nearly $\frac{1}{4}$ inch in thickness, became detached and lodged

itself at the inner angle of the eye. It was wedged in, the point being pressed firmly against the globe and the broad end against each eyelid and the side of the nose close to the caruncle.

Both eyelids were œdematous, and there was an ash-coloured slough involving the inner third of the integument of each lid, which extended to the side of the nose for about $\frac{1}{4}$ of an inch beyond the caruncle

On examining the eye, the cornea was found perfectly clear and transparent, but at about a quarter of an inch below the lower and inner margin of the cornea, there was a severe burn of the eye, extending inwards as far as the caruncle, and involving the corresponding conjunctival surfaces of both eyelids. The patient progressed favourably, and on December 28th the sloughs had separated from the external and internal surfaces of the lids, and left healthy granulating wounds. The burnt portion of the conjunctiva of the globe had also sloughed, but at one point, a little below the lower and inner margin of the cornea at the point against which the end of the hot metal had rested, the burn had extended deeper, and a slough of the sclerotic of the size of a small pea, not yet detached, was now seen.

January 1st. The slough in the sclerotic has separated, and through a nearly circular aperture, about the size of a small pea, the choroid is seen, on a level with, but not bulging through the wound. The eye shows no signs of inflammation, and the sight is good.

January 5th. The granulations of the palpebral surfaces of the lids are uniting to those of the globe, and those of the lower lid appear to be gradually contracting round the aperture in the sclerotic; one of the granulations is seen projecting into it. There is no irritation of the eye.

January 9th. The sclerotic is now united to the palpebral surfaces of the upper and lower lids to about the inner third of their extent. The wound in the sclerotic cannot be seen, the lower lid seems to have so completely united to the globe as to have closed it. The external wound of the lids has nearly healed. There is already a considerable contraction inwards and drawing together of the eyelids, diminishing to a great extent the palpebral aperture. The sight of the eye is good. He is able to read No. 4 of Jaeger's test-types.

March 6th. The man came to the hospital to show himself. The contraction of the cicatrix of the lids has caused the eye to be drawn inwards to a line within the mesial line of the orbit, and to be permanently fixed in this position. The cicatrix of the lids slightly encroaches on the pupil. The palpebral aperture is much diminished in size, and on attempting to read, and fix the eye on the object, there is a considerable flow of tears which impedes his sight. With difficulty he is able to spell words of No. 8 of Jaeger's test-types.

## ON THE RELATIVE VALUE OF ATROPINE AND OF MERCURY IN THE TREATMENT OF ACUTE IRITIS.

By T. Pridgin Teale, Junr., M.A.,

*Surgeon to the General Infirmary at Leeds.*

During the last two years and a half I have recorded in a tabular form the cases of acute iritis which have come under my care, in order to test the value of certain views of treatment which I had arrived at from the observation of such cases previously to this period. The exactness of the results is so marked, and the sequence of events so definite, that I feel justified in relating the cases to the profession, and in deducing from them certain principles of treatment, which, if not new, may at any rate not be generally known or acted upon in medical practice.

The table on which these remarks are founded includes all the cases of iritis, *as hereafter limited*, which have come under my care during the period referred to, with the exception of four or five in which I was unable to take notes regularly, or in which the treatment could not be thoroughly carried out. These excepted cases include, as far as I can recollect, only one case of severity, which was complicated by infiltration of cornea, and possibly by hereditary taint. Whether the cases are a fair representation of such as ordinarily come before the ophthalmic surgeon, or are exceptionally slight, I cannot presume to say, but such as they are they represent faithfully my own experience.

In speaking of iritis in this paper I exclude from consideration all cases of traumatic origin, all those which are secondary, *i. e.*, caused by extensive adhesions of the iris to the capsule of the lens left by previous attacks, all subacute forms travelling forwards to the iris from the deeper structures, and all cases occurring in children.

| Name and Address | Date | Age | Sex | Height | Colour | Duration | Previous treatment of present attack | Health | Tension | Pupil | Iris | Cornea | Retina & Optic N. | Tension | Pain | Tol. | Lac | Attempts Commenced. | Mercury Commenced | Gums affected. Slightly | Gums affected. Fully | Mercury Ceased | Pain Headless | Pain Ceased. | Pupil Dilating. | Pupil Fully dilated | Attempts Omitted | Progress. | Result. Date | Result. Visions | Result. Pupil | R. Marks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Richard W., 13, Trinity Street, Leeds | April 27th, 1863 | 25 | L | .. | Light | 3 hr | None | Fair | Dim | | Contracted (partly adhesion of | | Great | .. | Severe | .. | .. | April 27th | April 29th | May 1st | May 2nd | May 2nd | May 1st | .. | May 1st | May 2nd | Not recorded | .. | May 11th, 2 weeks | No. 1 | Active, non-adherent | |
| Edward D., 53, Byron Street, Leeds. | June 4th, 1862 | 31 | R | Dark | | 11 days | None | Pull lid from May 27, by Mr A | Good | Shadows could not count fingers | Contracted, inactive | | Hazy | Red rim round cornea | .. | Severe | .. | .. | June 4th | Pills, May 29th; ointment, June 4th | June 4th | June 6th | June 6th | June 6th | .. | June 6th | Not recorded | .. | June 17th, 2½ weeks | No 1 | Active, non-adherent | |
| Frances G. | June 23rd, 1863 | 33 | R | Probably | | 2 months | None | .. | .. | Cannot read No. 20 | .. | Adherent at several points | .. | .. | .. | .. | .. | July 1st? perhaps earlier | Used for 3 days | .. | 4th day | 4th day | .. | .. | .. | .. | Aug. 25th | .. | Sept. 1st | No 2 | .. | |
| Sarah H., 29, Black Swan Yard, North Street. | Aug. 10th, 1863 | 38 | L | .. | | 5 days | None | .. | .. | No. 20 | .. | Greenish, inactive | Red zone, hazy | Great | .. | Acute, increasing | Slight | .. | Aug. 9th | Aug. 11th, sight becoming more dim | Aug. 10th | Aug. 12th | Aug. 12th | Aug. 12th | .. | .. | .. | Aug. 24th | Aug. 16, No. 16<br>" 19, " 8<br>" 24, " 4<br>" 31, " 1 | Aug. 31st | No. 1 | Circular, slightly active | |
| Ann W., 9, Hound Street, Bagh Street | Aug. 10th, 1863 | 42 | R | Sore throat barricouing off, pains | Syph. | 1 week | | | .. | Counts fingers only | .. | Greenish, inactive | Red zone, hazy | Great | .. | Acute | .. | .. | Aug. 3rd | Aug. 12th | Aug. 20th | Aug. 24th | Aug. 21st | Aug. 20th | .. | Aug. 19th | | Not recorded | Aug. 20, No. 20<br>" 24, " 10 | April 29th, 1864 | No 2 | Active, one or two adhesions | |
| Hugh B., 6, Brook's Buildings, New Wortley. | Sept 30th, 1863 | 23 | R | Yes | Syph. | 6 weeks | .. | .. | .. | Not recorded | Contracted | .. | Red zone, hazy | Great | .. | Acute | Great | Great | Sept. 28th | 0 | 0 | 0 | 0 | Oct. 8th | Oct. 8th | .. | .. | .. | Oct. 8th | No. 6 | .. | |
| James H., 32, Saville Street, Wellington St | Oct. 3rd, 1863 | 19 | R<br>L | .. | .. | 6 weeks<br>4 weeks | None<br>.. | .. | .. | Dim<br>.. | Contracted<br>Contracted | Inactive<br>Inactive | Red zone<br>Hazy, red zone | Great<br>Great | .. | Acute<br>.. | Great<br>Great | Great<br>Great | Sept. 30th<br>.. | 0<br>.. | 0<br>.. | 0<br>.. | 0<br>.. | Oct. 3rd<br>.. | Oct. 8th<br>.. | Oct. 3rd<br>.. | Oct. 8th<br>.. | .. | Oct. 8th | R. No 1<br>L. No. 2 | Perfect<br>Perfect | |
| Mrs. F. H. S., 6, Malvern Place, Cemetery Road, Bulbeck | Dec 1st, 1863 | 26 | L | Yes | Syph | 2 weeks | Eye was re-lanced 8 months ago, and she suffered from sore throat, for which she was freely salivated by Mr S | .. | .. | No. 20 | Contracted | Inactive | Red zone | Great | .. | Severe | Great | Great | Nov 26th | 0 | 0 | 0 | 0 | .. | Dec 1st | .. | .. | Dec 9th | .. | Dec. 21st | No 1 | Perfect | 1864, January, a relapse cured when by atropine and leeches |
| Thomas B., 26, Marshall St. | Jan 1st, 1864 | 21 | R | Yes | Syph 6 months ago | 3 weeks | None | .. | .. | No. 16 | Contracted | Green, weakly, adherent | Red zone | Great | .. | Severe | Great | Great | Jan. 1st | 0 | 0 | 0 | 0 | .. | Jan. 16th | Jan. 2nd | Jan. 16th | .. | .. | Jan. 25th | No. 1 | One adhesion | |
| Ann K., 2, Billet Street, Bath Street, Leeds | Jan 16th, (about) 1864 | 28 | .. | Not made out | .. | .. | .. | .. | .. | No. 20 | Contracted Adherent | .. | Red zone, slightly hazy | Great | .. | Severe | Great | .. | January | 0 | 0 | 0 | 0 | .. | .. | .. | .. | At the end of two or three weeks | .. | March 16th | No. 1 | Active, circular, non adherent | |
| John G., 8, End Street, Woodhouse Lane, Leeds. | March 9th 1864 | 26 | L | Yes | Syph. 9 months ago | 1 week | .. | .. | .. | No. 1 | Irregularly Contracted | Inactive | Red zone, slightly hazy | .. | .. | Dull aching | Slight | .. | March 9th | 0 | 0 | 0 | 0 | .. | March 11th | .. | March 11th | .. | .. | May 4th | No. 1 | Active, one or two adhesions | |
| Joseph S., 5, Douglas Street, Leeds | Mar 8th, 1864 | 19 | L | Yes, 1 year ago | Syph. | 3 weeks | None | None | Good | No 16 | .. | .. | .. | 2 | .. | 1<br>Could not sleep | 1 | 2 | May 6th | 0 | 0 | 0 | 0 | May 6th, unmeasurable | May 9th | .. | .. | May 12th | | 1685<br>Dec — | No 1 | Active, non-adherent | |
| Susan D., 2, Cross Peel Street. | May 18th, 1864 | 24 | L | Symptoms Symptoms | ? | 2 weeks | Right eye 3 weeks ago | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | May 11th | May 16th | .. | May 20th | May 20th | .. | .. | .. | .. | May 24th | May 27, No 6<br>June 10, " 2<br>June 21, " 1 | July 8th | No. 6 | Regular and active | |
| Mrs C., 28, Caledonian Road. | June 13th, 1865 | 41 | R | Inferred | Syph. | 14 weeks | None | .. | Fair | Shadows, cannot count fingers | Hardly visible | Adherent, covered by lymph | Very hazy | 2 | .. | 2 | 2 | 2 | June 13th | June 21st | June 23rd | June 25th | June 25th | June 23rd | .. | .. | .. | June 29th<br>June 27th, resumed | .. | Feb. 2nd | No 18 | Entirely adherent | |
| Joseph F., 66, St James Street. | June 20th, 1865 | 30 | R | Yes | Syph. | 6 days | None | .. | Tolerable of late | Shadows; says he sees quite blunt | Not filled by lymph | Contracted | Consecutive chroupoid | 3 | .. | 3<br>"Fearful" | 3 | .. | June 20th, causing great pain | July 2nd | July 3rd | July 4th | July 4th | July 3rd | .. | July 4th | .. | July 18th | .. | July 21st | No. 1 | Active, non-adherent | |
| Henry C., 8, Burley Street. | July 2nd, 1865 | 23 | R | Yes, 7 years ago | Syph. | 2 weeks | None | .. | Broken down by syphilis | Shadows only | Not filled by lymph | Contracted | .. | 3 | .. | 3<br>Unable to rest day or night | 3 | .. | June 2nd, immediate relief | 0 | 0 | 0 | 0 | July 8th | July 8th | July 4th | July 8th | .. | July 16th | No 1 | Active, non-adherent | |
| Abraham N., Pea Croft Street, Armley Hall. | Dec. 21st, 1865 | 26 | R<br>L | Denied | Cold a week ago | 5 days | None | None | Good | No 1 | Clear | Slightly active | Bright | 2 | N | 2 | 1 | 0 | Dec 21st | 0 | 0 | 0 | 0 | Dec. 22 nil | Dec. 27th, afterwards | Dec. 21st | Dec. 22nd | .. | .. | Dec. 20th | No. 1 | Active, non-adherent | |
| Thos., 8, No. 6, Bible Buildings, New Road End, West 24. | 1866 Jan. 1st | 28 | L | Sore throat Rheumatism Hair falling off | Syph | 3 days | None | None | Fair | No 4 | Clear | Slightly active, 2 or 3 adherent, mostly at margin | Bright, red zone | 2 | N | 1 | 0½ | 0 | Jan. 1st | .. | .. | .. | .. | Jan 4th, after leeches, 0 | .. | Jan. 2nd | Jan. 6th | Jan. 6th | .. | Jan. 8th | No. 1 | No adhesions, sluggish | |
| Joseph D., 21, Richmond Rd Bank. | Jan 3rd. | 26 | R | Yes, 3 or 4 years, 2 bubos and chancre | Syph | 6 weeks | None | Extract of bella donna & mercury by Dr A Gums have been twice slightly tender | Fair | Shadows, can count fingers | Clear | Inactive, adherent at several points | Bright, some zone, cloudy, red zone | 1½ | N | 0 Occasional at nights | 0 | 1 | Jan 9th | Used previously | .. | .. | .. | Jan 11th, last night free from pain | Jan. 11th | Jan. 10th | .. | Feb. 17th | Jan. 16, points of cornea<br>" 11, No 20<br>" 27, No 6<br>Feb. 2, No 1<br>" 7, No 2 | Feb. 23rd | No. 1 | Active, slight adhesions | |
| Do. | .. | .. | L | .. | .. | 10 days | None | None | .. | No 2 | Clear | Slightly active, oval | Bright | 0½ | N | 0½ | 0½ | 0½ | Jan 13th | Date | .. | .. | .. | .. | .. | .. | .. | .. | Jan 12 No 2<br>Feb. 2 No 1 | Feb. 23rd | No. 1 | Active, slight adhesions | |
| Jas. S., 5, Bishop Field Street, Leylands | Feb. 2nd | 27 | R | Yes, husband had it | Syph. | 1 week | 6 months ago inflamed | None | Good | Shadows | Clear? | Fixed nodule of lymph | Slightly hazy | 2½ | N | 1<br>Sees it occasionally | 1 | 1 | Feb. 2nd | Feb 4th | Feb. 7th | Feb. 8th | Feb. 8th | Feb. 8th | Feb. 9th | Feb. 7th | Feb. 8th | .. | Feb. 2, pain no<br>" 3, " 2<br>" 15, No 1<br>" 20, No 1 | Feb. 20th | No. 1 | One adhesion | |
| Do. | Feb. 2nd | .. | L | .. | .. | 1 week | None | None | .. | Shadows | Clear? | Do. | Slightly hazy, pink zone | 1 | N | 1 | 2½ | 1 | Feb 2nd | Feb. 4th | Feb. 7th | Feb. 8th | Feb. 8th | Feb. 10th | Feb. 10th | Feb. 11th | Feb. 11th | .. | Feb 2, pain no<br>" 12, No 2<br>" 15, No 1<br>" 17, No 1<br>" 20, No 2 | March 3rd | No. 1 | One adhesion | |

NB—Abbreviations used in the Table—Syph Syphilis, T. Tension, Tol. Intolerance of Light, Lac Lacrymation. In noting the degree of pain, redness, intolerance, and lacrymation in these and other cases, I have found advantage the numbers 1, 2, 3, to represent to my own mind the various degrees of three conditions, somewhat after the plan introduced by Mr. Bowman in noting the degrees of tension. Arbitrary and inexact as such noting may appear, it represents at any rate something more exact than "much," "little," "slight," "improved," &c. Personally the method is a great help

These are excluded in order to simplify the inquiry, and restrict it to those acute forms, generally syphilitic, which occur in the previously healthy eye of the adult, and which, if neglected, rapidly endanger vision.

For treating such cases many remedies have been and are still employed—venesection, leeches, blisters, opium, purging, belladonna, turpentine, and mercury. Some surgeons use many of these in combination, others depend upon some single drug, others denounce particular drugs as injurious or useless. Some claim opium as a cure for all cases, with some belladonna is omnipotent, with others mercury and blood-letting are indispensable. In this variety of practice where lies the truth? Can we arrive at it? I trust that the following records will be accepted as an instalment in this inquiry, as they have been carried out in order to test the relative value of atropine and mercury, to ascertain how much each remedy can do, and to determine if possible the most effectual way of employing them. The present table is more extensive than the one originally drawn out, and is in consequence defective in some of the particulars.

[*See* TABLE.]

The cases here recorded appear to me to justify the following conclusions and principles of treatment.

1. Iritis can generally be cured, quickly and perfectly, by atropine alone, or by atropine and mercury combined, without the aid of other remedies. How far opium, blisters, leeches, and venesection aid and accelerate progress I have not yet tested, wishing in the first instance to determine the value of the remedies under consideration, and then to make the results herein obtained a starting point for further inquiry.

2. The presence or absence of syphilis does not affect the question of treatment.

3. Many, perhaps one-half, of the cases of iritis, *whether syphilitic or not*, can be cured by *atropine alone*.

4. Those cases in which atropine fails to dilate the pupil in 24 or 48 hours require mercury. In occasional cases the application of leeches renders an eye susceptible of dilatation which at first was unaffected by atropine.

5. When mercury is required it ought to be introduced into the system rapidly.

6. If the system is to be affected by mercury, the mercury ought to be introduced by *the skin*, *not* by the *stomach*. When this drug is introduced by the stomach the digestive powers are depressed at the very period when their healthy function is most needed. When introduced by the skin its full remedial effects are obtained without any impairment whatever of the powers of nutrition. It is my rule never to introduce mercury by the stomach when I wish to obtain rapidly the constitutional effects of the drug.

7. In those cases which require mercury it is sufficient to render the gums slightly tender. When the gums are even slightly affected we have therein evidence of the introduction of mercury into the system in quantity sufficient to turn the scale in favour of health, and carry the case to a successful issue. Therefore the moment we find the gums undoubtedly tender, or beginning to be tender, we may suspend the drug.

8. In most cases the constitutional effects of mercury, indicated by tender gums and improvement of symptoms, may be obtained on the second, third, or fourth days, provided the patient be confined to bed. Absorption of mercury by the skin appears to be *much more* rapid when the patient is confined to bed than when he is allowed to go about as usual.

9. Atropine should be used during the whole period of treatment, except where it causes great pain or increases conjunctival irritation, in which case it may be *temporarily* suspended, or dissolved in glycerine and applied to the skin.

10. That in cases requiring mercury the coincidence of tenderness of gums, of relief from pain, and of the action

of atropine on the pupil is almost absolute, even to an hour or two. Perhaps in cases more severe than those recorded, with great effusion of lymph, the visible effects of atropine may be delayed till a later period. On this point I do not possess evidence.

Let us now inquire how far these conclusions are justified by the cases, and what are the general results of treatment.

*Treatment.*—Of the 20 cases, eleven were treated by atropine alone, nine were treated by atropine and mercurial ointment combined. In one or two cases a dose of Dover's powder was given when pain was excessive, and in some others salines were given during the application of the mercurial ointment if the skin were hot and not perspiring. Leeches were used, I believe, in three cases only. Two cases had taken mercury before coming under my care.

*Question of Syphilis and its relation to Treatment.*—Thirteen cases were undoubtedly syphilitic. Of these five required mercury, eight recovered under atropine alone. In seven, syphilis was either denied or not made out. Of these, four required mercury, three were cured by atropine alone.

*Rapidity of Mercurial Effects.*—Of the nine cases in which mercury was required, one used the ointment 24 hours, a second 24 hours, having previously taken blue pill five days without benefit; a third and fourth used the ointment two days, a fifth and sixth three days, a seventh and eighth four days, the ninth twelve days. So that of nine cases of iritis in which mercury was used, one only required the application of the ointment for more than four days.

*Rapidity of Recovery.*—Of the 20 cases, seven recovered good sight and pupil within two weeks, one within a "short time," five within three weeks, three within four weeks, three within eight weeks, one within three months, the 20th was relieved from pain with partial recovery of sight.

*Perfection of Sight.*—Fifteen read No. 1 Jaeger, three (including the second eye of one case) read No. 2, two read No. 6, one could read No. 18.

*Perfection of Pupil.*—Twelve recovered with a perfectly active pupil free from adhesions, in five there were slight or single points of adhesions, in one there was closed pupil, and in two the condition of pupil is not recorded.

*Duration of Disease before Treatment.*—In eight the disease had existed not more than a week before coming under my care, in four not more than two weeks, in six less than two months, in one three months, and in one three months and a half.

*Condition of Vision before Treatment.*—In six cases vision was limited to perception of shadows ; in two it is described as dim ; in two the patient could not read Jaeger No. 20 ; in three the patient read No. 20 ; in two No. 16 ; in three No. 4 ; in two the condition of vision is not recorded.

*Disappearance of Mercurial Effects.*—In all the cases, although no special note is made on this point, the constitutional effects of the mercury passed off in a day or two, and in none do I recollect to have met with any injurious effect whatever which could be traced to the use of mercury.

*Relapse of Iritis.*—In one case only have I any record of a relapse, and this relapse disappeared rapidly under atropine alone. This fact tends to confirm Gräfe's assertion "that the principal cause of recurrence of iritis is the existence of synechiæ," in other words when iritis is cured with a pupil free from adhesions it seldom evinces a tendency to recur.

*Mode of using Atropine and Mercury in Iritis.—Use of Atropine.*—On first seeing a case of iritis, whatever its degree, I order atropine, of the strength of two grains to the ounce, to be dropped into the eye six times, at intervals of five minutes in the morning, and six times also in the evening. On the following day, if the pain is lessened

and the pupil is beginning to dilate, I conclude that the case is slight, and that atropine alone will cure it. If, however, the pupil is affected, and the symptoms are unabated, I commence mercurial treatment without delay.

*Use of Mercury.*—The patient is ordered to lie in bed, to wrap round each arm a broad piece of flannel, well smeared with mercurial ointment, and to wear this mercurial bandage until the gums are slightly tender, a small quantity of fresh ointment being added every evening. It is not necessary to *rub in* the ointment. I suspect that the "rubbing in," by producing irritation, impairs the absorbing power of the skin.

*Discontinuance of the Mercury.*—As soon as the symptoms of the disease begin to abate, or the gums begin to be tender (and these two conditions are generally coincident) the mercury is discontinued. In none of these cases has mercury been given by the mouth (except in two cases, which had been so treated before coming under my care), and in none has the ointment been rubbed in.

*Discontinuance of the Atropine.*—As soon as the pupil is fully dilated, as far as any adhesions will permit, the instillation of atropine is reduced to once or twice a-day, and continued at this rate as long as redness or tenderness of the eye remains.

This mode of treating iritis coincides very nearly with that described by Gräfe (on Iridectomy, New Syd. Soc. 1859) in using atropine as the main remedy, and mercurial inunction in cases too severe to yield to the atropine. It differs from it in dispensing with *rubbing in*, and with the use of mercury by the mouth. Mr. Dixon, in his early remarks on iritis, condemns belladonna; in his later work he speaks timidly of its use as an appendage to other treatment. The cases here recorded prove Gräfe to be correct in claiming atropine as the sheet anchor, and in making other remedies subordinate.

William Lawrence and most ophthalmic writers give mercury by the mouth, and do not mention its introduc-

tion by the skin. They speak of the coincidence of the improvement in the symptoms with the first appearance of constitutional effects of the mercury, and make this the signal for the reduction, not as I have done, for the entire omission of mercury.

Blood-letting, local and general, is usually urged as indispensable in iritis. That it is not so I think the foregoing cases prove. I believe, however, that local blood-letting may be a valuable addition to other means of treatment, and that it facilitates the absorption of atropine, and accelerates its effects.

*Note on the Action of Atropine.*—Writers on iritis generally rest the credit and value of atropine or belladonna on its power of dilating the pupil, in setting at rest the muscular tissue of the iris and ciliary body, and in diminishing the risk of the formation of synechiæ. I cannot, however, but suspect that it does more than this, that it acts as a direct sedative on inflamed and congested tissues, and that much of its power depends upon its influence in contracting the blood-vessels. I cannot in any other way explain the remarkable value of this drug in many cases of ulcer of the cornea, and so-called strumous ophthalmia, a large proportion of which I treat by atropine only. Nor can I explain in any other way the immediate improvement, and rapid and complete recovery by means of atropine alone, of many cases of syphilitic iritis. That atropine does reduce the size of blood-vessels I have no doubt, having several times satisfied myself of the fact by observing the calibre of delicate vessels traversing the cornea before, and shortly, after the instillation of atropine.

## CLINICAL LECTURES ON CASES OF INFLAMMATION OF THE OPTIC NERVES.*

By Jonathan Hutchinson.

*Lecture II (continued).*

In connection with syphilis, as an occasional cause of optic neuritis, I must admit that I have never seen the disease in its early stage. I have seen several patients, the subjects either of inherited or acquired syphilis, in whom complete blindness with white atrophy of the nerves occurred, and in whom there seemed fair reason to suspect that inflammation of the nerve had preceded the atrophy. I have, however, never been enabled to prove that it did so, that is I have never in a syphilitic case found the disc swollen and woolly.

In our last lecture I mentioned the details of three cases, in two of which arachnitis at the base of the brain was discovered, and in the third of which the patient is still living. I have now to record another important case in which we obtained an autopsy, and found, as we had suspected, a cerebral tumour as the cause of the mischief. The details of the case are rather lengthy, but as they may prove of interest in reference to other questions in nerve pathology besides the one now under consideration, I shall not venture to shorten them. During the two years that the patient was under my care I had the advantage of several consultations with Dr. Hughlings Jackson.

*Violent Headaches with Deafness in one Ear—Vomiting—Neuritis of both Optic Nerves, resulting in Total Blindness.—Total Paralysis of Left Fifth Nerve and Destructive Inflammation of the Cornea—Death three Years after the commencement of Symptoms—Autopsy—Tumour in the pia-mater on Left Crus, &c.*

Mrs. W., aged 36, was first seen by me in December 1863. She had then been for about a fortnight totally blind. I received

* These lectures were addressed to the students attending the Ophthalmoscopic Demonstrations at Moorfields.

the following account of her previous symptoms. About the middle of August she began to suffer from severe headache. It was first in the nape of the neck and then in the back and top of the head. She had much sickness (vomiting).

In the end of September the left eye began to fail; she had much pain in the eye, but it was not reddened. A few weeks later the other followed.

At no part of her illness was she quite confined to bed, but for some weeks she was very ill.

December 10, 1863. At present she has but little headache, pain now and then in the back of the head, but not nearly what she had at first. She has not been paralysed, and has never had any fits. The eyes diverge slightly. Her aspect is heavy, and amaurotic expression is very marked.

Mrs. S. had been under the joint care of Dr. Broxholme and Dr. Jeaffreson before she came to me, and a diagnosis of tumour on the brain had been given.

Ophthalmoscope. Media quite clear in both. *Right* fundus veins turgid and very dark. On the disc are several effusions of blood, apparently from veins. Several small apoplexies are also seen at other parts of the fundus, none of them exactly at the yellow spot. The optic disc itself is grey and looks swollen and elevated. The adjacent parts of the retina are also somewhat hazy. The arteries are very small. In the other eye very similar conditions are seen, excepting that the apoplectic effusions are much fewer and smaller, and none of them are on the disc itself.

January 9, 1864. She seems in most respects better, but still cannot perceive light. The pain in her head is much less severe and less constant. She now sleeps well. Is still giddy when she walks or sits up long; feels most comfortable in the recumbent position. Her feet, which were formerly very cold, are now comfortably warm. She still has, occasionally, severe pain in the back part of the head, and in the vertex, sometimes a creeping sensation in the scalp. She has perfect use of her hands, but sometimes, when the pain in her head is severe, "the hands tingle and creep, and become numb." She has several times had vivid flashes of light before the eyes, but never the slightest perception of objective light. Appetite good; tongue clean.

The pulse is exceedingly feeble and very peculiar. It falls back so immediately after the stroke that it is very difficult to count it. It is certainly not less than 140. There is no bruit over the heart, but its pulsation is very feeble, and the second sound wanting in sharpness.

She complains that she cannot smell anything. For two years she has been deaf in the left ear, with the right ear she can hear well. She believes that she cannot hear anything whatever with the left ear. She became deaf gradually, being at the time in perfect health. The first symptom was that one day in the street she heard a loud ringing of bells, it lasted only about half an hour. She attended an aurist but got no benefit. She had no pain. Her eyes are prominent and staring; pupils twice the natural size and motionless; aspect amaurotic. She is very helpless and will not move unless guided, but she asserts that she feels quite strong in her legs, if she could but see.

Ophthalmoscope. The optic discs look woolly and fluffy; they are of a grey colour, not pink; the veins in them are large, very dark and tortuous.

March 4, 1864. During the last three weeks she has had much less pain and been better in all respects. She sleeps well and has none of the "old pain," though there is still some numbness in the back part of scalp. Three weeks ago she had an attack in which her friends all thought she would die. On the same evening she had two attacks. During the day she had been cheerful and feeling very well. Suddenly violent pain in the head came on "as if her skull would split," also much pain in the vertex. She was very sick and vomited violently, her face was drawn to the left side, with constant twitchings of the left cheek. Her hands and feet were very cold, and she was deathly pale. Her husband was hurriedly fetched and for nearly an hour all thought she was dying. Then all symptoms passed away, and the next day she was as well as ever.

Latterly the left side of her face has often twitched. She can now move both cheeks well. Sensation seems equal on both sides. It is not perfect, and yet there seems a degree of hyperæsthesia, thus she starts when the compasses touch her. On her hands sensation is imperfect and she cannot tell with certainty which part is touched, or whether one or two points are touched. Here, too, there is morbid irritability. I am told

that she can use her hands well; feeds herself, makes her bed, &c.; can walk, but cannot go upstairs alone, "it would make her faint." She is obliged always to sleep with the head high; dreams very much. Bowels still very costive. She is rather deaf in her right ear, but attributes it to cold.

During the last three weeks she has never been sick, but during the week immediately preceding her attack just described she often vomited violently.

August 10, 1864. Considers herself in greatly improved health, and looks well. Her features have quite lost the oppressed, bloated aspect which they once had. She is florid, and has an excellent appetite. She feels much stronger than she did a month ago, and goes out every day. Yesterday she walked three miles with ease. No sickness lately; bowels freely open; no weakness of the limbs in either half of the body. She complains greatly of pain in the left leg. It begins behind the hip and passes down as low as the ancle, never in the foot, and very rarely in front of the thigh. It is a gnawing, aching pain. It goes off when she stands or walks, and is worst when warm in bed. It has now lasted for a month and gets worse. No "pins and needles" in the feet, but frequently in the hands, sometimes one hand, sometimes the other, more often the right. She complains much of a throbbing burning pain in the head, about the right parietal eminence. From this pain she had been wholly free for six weeks or more. Both globes are prominent; the pupils are large and almost motionless.

April 3, 1865. Her husband reports that one left half of the face is quite without feeling. She can speak clearly and can shut both eyes, but cannot feel at all in the cheek or forehead. Almost every hour, night and day, she has an attack of violent pain, starting in the head and passing into the feet. Her face is then drawn to the left side, and twitches. These attacks wake her in the night.

After the last note Mrs. W. continued much in the same state, suffering frequent paroxysms of most severe pain and rarely able to sleep. The left side of face remained without sensation, and the left eye at length inflamed and the cornea sloughed. I was not attending her at this time and only received an account of her symptoms from her husband. After a series of convulsions death at length relieved her of suffering in the early part of September.

*Autopsy.*—I was assisted by Dr. Hughlings Jackson and Mr. Waren Tay. The head only was examined, and that under some disadvantages. We found a lobulated tumour the size of a large walnut on the left side, just above and behind the inner half of the petrous bone. The bone itself was deeply eroded by the new growth, which was lodged in part in a hollow thus formed. The fifth nerve was entirely disorganised by the growth, to which also the seventh pair adhered. The tumour had pressed aside the adjacent parts of the cerebellum and pons, but it did not involve their structure, and was connected with the pia-mater only. It consisted of a soft, red, semi-transparent structure, and shewed under the microscope delicate fibres and numerous nuclei. The brain substance generally was very soft, but there was no evidence of inflammatory changes at any part. The optic nerves were small, rather soft, and of grey colour.

I regret that in the above case I have no note as to the state of the optic discs during the last few months. Up to the last ophthalmoscopic examination they still remained swollen and woolly. It is an interesting question as to how long in neuritis cases this condition persists, and whether it is influenced by treatment. There can be no doubt that in many instances the lymph clears away again soon after its effusion, and leaves the disc in a state of white atrophy, which it is often difficult to distinguish from that which comes on without any antecedent stage of inflammation. It was so in the case of Oakley, above described. In this case we gave mercury in the first instance, and we imagined that the rapid absorption of the lymph was due to its influence; but as the other cerebral symptoms increased soon after, this inference was not very positively supported.

A girl named Absolant (aged 20) is now attending, and at a former demonstration you had an opportunity of examining her eyes. In both the media are clear, and the discs woolly and grey:—in a most characteristic condition of neuritis. This state of the discs has continued in *statu*

*quo* for ten months. The discs are elevated, and can easily be seen in the erect image. I suspect that this girl has a cerebellar tumour. She is exceedingly pale and feeble, and has suffered most severely from headaches. Her illness began with headache, which was so severe that for some weeks she scarcely ever slept. Whilst in this condition a surgeon ordered her a large blister to the nape, and it had the effect of at once relieving the pain, which did not recur for some weeks. She has had no paralysis, nor any fits. She is quite blind of the right eye, and can only just make out letters of No. 20 with the other. Her mother states that her temper is wilful almost to the extent of actual insanity. This girl did not come under my care until two or three months after the neuritis set in, and during the nine months that she has remained under my observation subsequently but little change has occurred. At present she is heavy and sleepy, and liable to a severe headache twice a-week. Her pupils are of medium size, and very sluggish. She eats freely, and has no vomiting.

## Lecture III.

*Delivered March* 8, 1865.

Gentlemen,—As we have this evening had before us two splendid examples of optic neuritis in its most characteristic stage, I shall avail myself of the opportunity to recapitulate what is known respecting this disease. First we will describe the cases. The subject of the first is a young and healthy looking man, who tells us that he has never suffered from syphilis, and that he has no particular illness. He has had no vomiting, and but little headache. He was a heavy smoker (half ounce a-day) until three months ago, when, finding, as he thought, that it made him nervous, he reduced the quantity. It is nine months since his sight began to fail, and it failed quite gradually. He can now just make out No. 20. His pupils

are rather large and sluggish. Such being the history which he gave, I quite expected that we should find his discs pale and atrophied, as we usually do in the amaurosis of smokers; but to my surprise, instead of this, we find neuritis in its most characteristic stage. Fig. 6 of Plate XI of Liebreich's beautiful atlas might have been taken from this case, so accurately do the appearances correspond. The discs are much elevated, so that with the binocular they look like little hillocks, down the sides of which the vessels run. The striated condition, like carded wool, is very definite. The veins are very turgid, and the arteries small. There are no apoplexies, and the retina, excepting near to the margins of the discs, is quite clear. The two eyes are exactly alike. So much are the discs elevated, that they are seen in the erect image with very unusual ease, and at considerable distance.

You will notice that this patient's history is not at all like that of most cases of neuritis. Excepting a little headache, occasional giddiness, and what he calls general nervousness, he has had no brain symptoms. The loss of sight has been gradual, not rapid. Although nine months in progress, it is still incomplete and still the discs are much swollen. I much fear that the cerebral symptoms are yet to follow. You will have observed that he was intolerant of examination, and, like many other neuritis patients, complained that the light thrown into his eye made his head ache. I have several times known fainting to be produced by ophthalmoscopic examination in these cases. Yet there is no real intolerance of light; it seems rather that the endeavour to fix the eye causes annoyance.

Our second patient is a married woman, aged 30, who has had a well marked attack of head symptoms, and who is now quite blind from the effects of neuritis. Her optic discs are almost exactly like those of the young man, but there is less effusion and less swelling. It would appear that absorption is going on.

Mrs. T. is aged 30, and is stout and florid. Until fifteen months ago she could see perfectly. She then for the first time had a fit, and afterwards others frequently occurred. She was in bed when the first occurred. During the fits she would foam at the mouth, but she never bit her tongue. She has never had any paralysis. There has been great pain in the head, chiefly at the vertex, often sufficient to keep her awake at night. Her sight failed gradually, but with great variations, from day to day; on one day she could see fairly, and on the next not at all. She had frequent photopsiæ, but did not notice any fog. In last November (nine months from the first fit) she had what was called gastric fever, and went into St. Bartholomew's Hospital. At this time she says she was losing her intellect altogether.

Present condition. The left pupil is large and fixed, the right not so large, and still retaining a slight amount of activity. The left eye has no perception of light; with the right she can at times perceive shadows. Her face is pitted all over by the scars of a rash, from which she suffered four years ago (query, syphilitic).

(*To be concluded.*)

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Part I.

## Original Contributions.

### CASES OF MALIGNANT TUMOURS IN THE EYE, OR IN CONNEXION WITH THE NERVES.

By J. W. Hulke.

Case I.—*Retinal Glioma in each Eye, extending along the Optic Nerves within the Skull—Death from Meningitis.*

In the third and fourth volumes I published eleven cases under the title "Carcinoma of the Eyeball." Since then Virchow's valuable criticism of several of these,* and a better acquaintance with the minute structure of morbid growths, have taught me that I used the title in a wider sense than a strict anatomical definition allows, and that true cancer is less common in the eye than I had thought. I mean cancer characterized by an epitheloid type of cell, an organoid disposition of the cell-masses, and their out-budding into and intercalation amongst the normal tissues

* Virchow. Die Krankhaften Geschwülsten. Berlin, 1864.

as something superadded to them, and the absence of a strictly intercellular substance.*

The morbid growths which, in the third, fifth, and three last cases of the series, I then regarded as medullary cancers, I have now little doubt were gliomas, tumours originating, according to Virchow, in the interstitial connective tissue (neuroglia) of the retina. The softer varieties consist of small rounded cells, about the size of a pus or blood corpuscle, embedded in a finely granulated intercellular substance, and occasionally massed in plaques resembling those formerly considered characteristic of myeloid tumours; while in the firmer varieties fusiform cells occur, and the intercellular substance is fibrillated. Both kinds are abundantly supplied with blood-vessels.

The neuroglial origin of these tumours has been deduced from their similarity to cerebral gliomas rather than verified by direct investigation, which is not surprising, since generally all traces of the retinal tissues have disappeared at the time when extirpation of the eyeball is commonly practised. Schweigger's demonstration of the origin of the glioma cells in the cells of the granule layers, quoted by Virchow, is open to doubt, for the outer and the inner granules being certainly nervous, and not of the nature of connective tissue, the morbid growth if it originated in these was not a glioma. I have not myself been more successful in demonstrating the origin of intraocular gliomas, although I have minutely examined several with great care, but in the case about to be described, where a retinal glioma in each eye extended along the optic nerves within the skull, I distinctly observed the growth of the glioma in the connective tissue separating the bundles of nerve fibres in the nerve-trunk in front of the optic commissure.

All the intraocular gliomas which I have seen have occurred in children, the age in which cerebral gliomas

* Virchow, *loc. cit.*

are most frequent. Wherever I have had an opportunity of watching the progress of an intraocular glioma, or of examining it minutely after enucleation of the eyeball, I have found distinct evidence of local infection. This infectiousness, and the tendency of the gliomas to fungate, often cause them to be mistaken for cancers; but besides their anatomical differences, the gliomas, as far as my present knowledge of them extends, never infect parts at a distance as cancers do, and are never accompanied with secondary tumours in the abdominal and thoracic viscera.

They are very liable to fatty and earthy degeneration, which so change their rough appearances that when altered in this way they are not infrequently mistaken for tubercle. But of this latter in the eye we have scarcely any exact knowledge, for the cases recorded by the older surgeons are of no value whatever for proving its occurrence, and the data for its differential diagnosis with the ophthalmoscope have yet to be worked out. I have not myself seen a single case of tubercle which was not open to doubt. From the uncertainty of the differential diagnosis of an intraocular morbid growth in its earliest stage, we deduce the safe general rule to remove the eye whenever one is present, whatever its nature (unless a simple cyst or stationary congenital sarcoma such as those occasionally occurring in the iris), since glioma, when left alone, kills scarcely less certainly than cancer, and a tuberculosed eye is not merely destroyed as an organ of sight, but may be a source of much trouble. The local nature of the infection in glioma makes the prognosis in this much more favourable than in cancer, by increasing the chances of its non-recurrence after removal.

February 27th, 1865. A child, two years old, was brought to the Middlesex Hospital by his parents, fearing that he was blind.

Both pupils were widely dilated and motionless, and a brilliant yellow reflection from the bottom of each eye was conspicuous, even at the distance of several feet. This proceeded from the

surface of a tumour, growing into the vitreous humour. Each tumour had a tuberous shape, and its surface was overlaid with a network of fine, frequently-branching, anastomosing vessels, and a few large tortuous veins, and also blotched with crimson spots of extravasated blood. In the left eye the tumour reached nearly to the back of the lens; in the right eye it had not advanced quite so far. It is needless to say that both eyes were absolutely blind.

It was a well grown and apparently healthy child. Both parents and their other children, several in number, were healthy. The first suspicion that something was wrong with the child's eyes arose at Christmas, when he began to stumble over things lying at his right hand. Soon after this the mother noticed a bright spot in the right eye, and a month later a similar spot in the left.

The resemblance of the tumours to those in the 3rd, 5th, 9th, 10th, and 11th cases, published in vols. 3 and 4, inclined me to regard them as retinal gliomata.

That the tumours were actually morbid growths springing from the retina, and not simply elevations of the retina, pushed forwards by serum or a solid mass behind it, was inferable from the character of the vascularity and the complete concealment of the choroid. As both eyes were affected, and the child, if it survived and grew up, would have to earn its living by manual labour, I did not advise extirpation, and the parents returned home with the child.

Just one year later, February 26, 1866, he was again brought to me. Now a large fungating tumour protruded from the right eyeball, between the greatly distended eyelids. Its ulcerated surface was coated with a thick crust of dried ichor and blood, and bled freely when this was accidentally detached. The mother told us that the eyeball had burst about a month before, and that for some time previously the child had suffered much, scarcely sleeping, and losing flesh.

The left eyeball was now enlarged, the cornea dull, the pupil dilated, the lens pushed forward, squeezing the iris against the cornea, but still sufficiently transparent to permit a dull white object behind it to be seen.

His manner was very curious; he never moved unless disturbed, and then cried, but lay day and night on his face

with his knees touching his chin, and his forehead buried in the pillow.

Having in similar cases witnessed much temporary relief from the extirpation of the fungating tumour, I proposed it simply as a palliative, warning the parents to expect a quick return.

As they gladly acceded, next day the child was put under chloroform, and I extirpated the tumour and eyeball with scissors and forceps, dividing the optic nerve at the apex of the orbit, detaching the soft tissues from the bony walls, and then pressing into the bottom of this cavity a ball of cotton wool, smeared with chloride of zinc paste.

The first night the child slept little, and next day the eyelids were very swollen. In three or four days suppuration had set in, and on the sixth day the cotton wool, being loose, was withdrawn, and the orbit syringed out with Condy's lotion. This latter was afterwards repeated twice a day, in order to flush out the exfoliated sloughs caused by the zinc, and the discharges. During this time the child slept and eat well, gaining weight and strength. The wound granulated and scarred in front, but at the apex of the orbit a button of exuberant granulations budded from the optic nerve. A month after the operation meningitis set in, and ended fatally on the twelfth day.

After death the left eyeball and the brain were hardened with alcohol. The extirpated eyeball was examined both in the fresh and hardened state. It was filled with a soft, pinkish-grey tumour, continuous in front with a fungating mass, which protruded through the ciliary circle of the sclerotic, the cornea having disappeared, and was prolonged behind into the greatly swollen optic nerve. Sections of the tumour displayed, under a magnifying power of 240, small round cells ranging between $\frac{1}{4300}$th and $\frac{1}{2730}$th, with one or two minute nuclei, closely packed in a scanty intercellular substance, structureless when fresh, but made granular by chromic acid and alcohol. (Fig. 1.) The tumour was pervaded throughout by a rather close net of blood vessels.

The free edge of the ciliary sclerotic was swollen and succulent through infiltration with small cells resembling those of the tumour. Where they were less abundant, their evolution out of the connective tissue corpuscles was apparent.

The choroid was distinguishable only in the front of the

eyeball, and here it was very thick, owing to the presence of cells resembling those of the tumour. The back of the eyeball and the optic nerve were embedded in a tuberous mass, identical in its structure with the intraocular growth with which it was continuous through the sclerotic. The orbital end of the divided optic nerve and the intracranial part of the nerve were much enlarged. This enlargement extended along the right side of the optic commissure to just behind its posterior margin. It proceeded from the infiltration of the nerve with cells rather smaller, but in other respects similar to those composing the ocular tumour (Fig. 2.) Traces only of the nerve fibres were to be seen.

The retina in the left eye formed a solid greyish axial tumour, separated from the choroid by an albuminous exudation (Fig. 3). The cut surface of the tumour was mottled with many small whitish dots, which were minute patches of a fatty disintegration, and with red blotches of extravasated blood. The minute structure of the tumour agreed with that of the tumour of the right eye. The orbital part of the optic nerve was not obviously enlarged, yet inside its sheath, and amongst the bundles of nerve fibres, there were masses of cells identical with those of the intraocular tumour.

The cranial part of the nerve was obviously swollen and hard. Sections of it parallel to, as well as across the nerve fibres, exhibited an abundance of small circular cells replacing the connective tissue between the nerve bundles, and clearly originating in it, a point of extreme interest because in the retina the tumour had advanced too far to permit me to determine its origin (Fig. 4).

If we may judge by its good effects on the child's general condition, the operation had not any direct relation to the fatal issue of the case; for we may fairly infer from the time at which the meningitis supervened (when the sloughs had separated and cicatrization was advanced) that it was not caused by an extension within the cranium of the inflammation set up by the application of the chloride of zinc to the orbital walls, a measure which experience has proved to be most valuable and much less dangerous than might have been expected on *a priori* grounds.

CASE II.—*A Case of Spindle-celled Sarcoma of the Pars Petrosa of the right temporal Bone, causing Anæsthesia of the right Eyeball and right half of the face, and Paralysis of their muscles, in the course of which Ophthalmia and Ulceration of the Cornea of this Eye, and Neuro-retinitis of the left Eye occurred.*

The chief pathological interest of this case consists in its bearing on the still mooted existence of a direct control by the fifth cranial nerve over the nutrition of the eyeball, and in the association of inflammation of the optic nerve with an intraocular tumour. The speedy cicatrization of the ulcer (of more than two months' duration) when the insensible eye was protected by a compress from cold and from the intrusion of foreign bodies, and the subsidence of the ophthalmia twice on the removal of a foreign body detected within the eyelids, without any other treatment, favour the opinion that the ulceration and ophthalmia were excited and maintained by causes acting on the eye from without, and that they did not directly arise out of the anæsthesia.

The neuritis, diagnosed in the left eye with the ophthalmoscope, no doubt had its origin in the disturbance of the venous circulation caused by the advance of the tumour from the right middle fossa of the skull through the sphenoidal cells into the left cavernous sinus. The relations of the principal mass of the tumour make it very probable that the blindness of the right eye, at an early stage, also resulted from neuritis produced in a similar manner.

November 4, 1863. A brunette, æt. 59, was sent to me by Dr. Tanner, with ulceration of the right cornea, which had begun in the preceding August.

The centre of the cornea was perforated by a large ulcer, through which a button of iris coated with lymph protruded, and the periphery was cloudy and vascular. The conjunctiva was inflamed, and it and the cornea were insensible. The upper,

lower, and internal recti muscles, the levator and orbicularis palpebrarum were all incompletely paralysed. The right temporal fossa and the right cheek were hollow; and when she clenched her teeth no contraction of the temporal and masseteric muscles was felt. The muscles of expression on the right side of the face were palsied and contractured, the mouth being drawn towards the right; and the buccinator alone, on this side, retained slight contractility.

The sensitiveness of the right side of the face and of the corresponding front half of the scalp was much diminished, the anæsthesia ceasing abruptly at the middle line, while she felt an intolerable plunging, burning pain in the anæsthetic parts.

*History.* Married, without family, catamenia ceased at 55; until then her health had always been good, but about a year after neuralgia began in the right side of her head and face, and the visual acuity of the right eye progressively decreased till quantitative perception of light was lost, and this without any externally apparent ophthalmia. I could not ascertain the order in which the anæsthesia and the motor paralyses followed.

The treatment which had been employed during the first three years consisted in mercurials and leeching. Her friends then placed her under Dr. Tanner, who prescribed tonics and opiates, with the effect of lessening the pain and diminishing her emaciation.

At the time I first saw her the palsy of so many nerves, five, the 2nd, 3rd, 4th, 5th in its three divisions, and the portio dura of the 7th, easily fixed the situation of the disease in the middle fossa of the skull, where all these nerves gather together just before they escape from the cranium through their respective foramina. As regarded the nature of the disease, I was disposed to suspect a fibroma of the dura mater lining the middle fossa of the base of the skull, or of the petrous part of the temporal bone, because there was not any evidence of syphilis, rheumatism, or gout, which might have pointed to a circumscribed meningitis, or osteitis, because her age, 59, made tubercle and glioma improbable (I have seen cerebral gliomata only in the young), and because the duration of her illness and the absence of enlarged glands in the neck excluded cancer.

Having in my mind Snellen's experiments on rabbits, in which section of the 5th nerve within the skull was not followed

by corneal inflammation, though the eye was completely anæsthetic, when the intrusion of foreign bodies was rigidly prevented, and the eye shielded from inadvertent blows by sewing the sensitive ear across it to the nose,* I treated my patient by closing the eyelids with a strip of sticking-plaster, and covering the eye with a light cotton wool compress. These simple measures at once prevented the entrance of dust, and protected the inflamed organ against sudden exposure to changes of temperature.

At her next visit, four days afterwards, there was already a manifest improvement; the hernia iridis was less prominent, and the conjunctival inflammation had diminished. The same treatment was continued, and by the end of the month the corneal ulcer had completely cicatrized, and the ophthalmia had entirely disappeared.

She continued to wear the compress, finding it comfortable, and the eye remained free from inflammation till February 3, 1864, when I observed a slight ophthalmia, and detected some threads of cotton-wool beneath the eyelid, of the presence of which she was not conscious. I removed these, and the ophthalmia soon subsided. On the 13th of April she had another attack of ophthalmia, the inflammation was limited to a portion of conjunctiva that was fretted by some eyelashes which she had turned inwards against the eye by applying the strap of plaster clumsily, and it ceased when the misdirected lashes were replaced in their proper position.

In September, during my absence, she complained that the sight of her left eye was failing, and in the following November I found V. = No. 18 J. There were well marked signs of neuritis. The right ear was now quite deaf. She walked unsteadily, owing to imperfectly coordinated muscular action in both legs, and from the same cause the voluntary movements of the arms were irregular. I did not again see her alive, but learned that after convulsions, which recurred frequently during several days, she died December 12th.

Dr. Tanner courteously afforded me an opportunity of making a *post-mortem* examination, which the relations restricted to the head.

* Snellen. De Invloed der Zenuwen of de Ontsteking proefondervindelijk getoetst. Utrecht, 1857.

We found a sub-globular tumour, measuring two inches by one inch and a half in its antero-posterior and transverse diameters, projecting from the right petrosal bone into the cavity of the cranium. The tentorium cerebelli imperfectly divided it into an upper and larger lobe, which lay in the middle fossa, on the upper surface of the pars petrosa and the conterminous part of the greater wing of the sphenoid bone, and a lower and smaller lobe, which projected beneath the tentorium in the posterior fossa, and overhung the posterior surface of the pars petrosa. The distended and thinned dura mater clothed the free surface of the tumour.

The examination was unavoidably too hurried and imperfect to allow us to precisely determine all the deeper connections, but we ascertained that the tumour passed through the floor of the skull into the pharynx, and filled the sphenoidal sinuses.

The brain had a hollow in its base corresponding to the tumour. The ventricles and the sub-arachnoid spaces contained a few drachms of clear serum. Both the optic and the olfactory nerves were œdematous. The third, fourth, fifth, and sixth nerves on the right side were lost where they pierced the dura mater clothing the tumour, and the seventh nerve at the meatus audit. int. The intra-cranial portions of these nerves did not offer any differences recognizable by the unaided eye from those of the left side.

The intra-cranial portion of the internal carotid artery was compressed between the tumour and the right side of the body of the sphenoid bone, and that part of the vessel which corresponds to the canal in the pars petrosa traversed the middle of the tumour. The interior of this roughly resembled an aneurism; the centre consisted principally of friable red blood-clot, and the periphery had the consistence and grey colour of decolorized fibrine. Owing to the great quantity of extravasated blood, the proper structure was hardly recognizable in the centre, but it increased in distinctness towards the periphery. It consisted of a fibrillated intercellular tissue, in which were embedded small oblong, circular, roundly-oval, and spindle-shaped cells, the cellular being in excess of the intercellular constituent (Fig. 5). In some parts the cells were grouped in parallel rows, in other parts no definite type of arrangement was observable. In removing the tumour, the carotid artery was injured, and the

source of the extravasated blood could not be demonstrated, but the large quantity and chief abundance of it around this main vessel, favour the idea that it escaped from an opening in it.

CASE III.—*A Case of Fungating Infecting Melanotic Sarcoma, originating in a withered Eyeball, filling the Orbit and protruding between the distended Eyelids, successfully extirpated with the aid of the actual Cautery and Chloride of Zinc Paste.*

The plan of operation practised in Case I. (page 171) was most successful in the following, which I publish chiefly with the object of drawing attention to it. Without experience we might conceive that the use of the cautery and caustics in the orbit would be fraught with extreme danger, owing to the thinness of the roof of this cavity and the nearness of the brain. The fact that the destructive action of the hot iron is comparatively superficial has, however, been long recognized by surgeons who formerly were in the habit of using it to hasten the exfoliation of sequestra; and during the last few years we have had frequent lessons in our cancer wards that the chloride of zinc is a very manageable caustic, the immediate effects of which can be regulated with some certainty, while it excites little inflammation in the living tissues beyond the slough, and little constitutional disturbance.

The formula commonly used in the Middlesex Hospital contains one part by weight of chloride of zinc rubbed up with four parts of flour, to which sufficient tinctura opii is added to make a paste of the consistence of honey. It is applied upon lint.

A gentleman, æt. 68, consulted me in August, 1865, in consequence of repeated bleeding from a fungating tumour of the right eyeball. A large tuberous mass filled the orbit, concealing the eyeball, distending the eyelids, and protruding between them. Its summit was covered with a crust of dried ichor and blood. The eyelids were overrun with large varicose veins, and

so thinned by extension that the black colour of the tumour was seen through them. No disease of the lymphatic glands, or of the abdominal or thoracic viscera, was discoverable, but the patient was blanched by the repeated loss of blood.

He said that until lately he had been remarkably well and active for his age. Eight or ten years previously the sight of his left eye had failed; he was told it was amaurosis. About two or three years after this the eye on several occasions was red and painful, and then it slowly shrank. At the end of two years more he began to wear an artificial eye. The maker of this remarked to him that the stump was very congested, and soon after it began to enlarge. At this time he consulted an eminent ophthalmic surgeon, who informed him that the disease was cancer, and expressed a very positive opinion against extirpation, which he repeated on a subsequent occasion, when the enlargement had become very considerable, and overruled the advice of a junior consultant to remove the tumour without delay. Believing his case beyond help, the sufferer sought no further advice until often-recurring hemorrhages threatened to end his existence.

Desperate as his case was at this time, I thought he would at least gain a respite by the removal of the tumour, and I determined to adopt a plan which, shortly before, had been very successfully practised in a similar case at the same stage by my colleague, Mr. D. Morgan, consisting in the thorough removal, with the knife, of all the soft tissues from the orbit, followed by cauterization with the hot iron, and the application of chloride of zinc paste to the bony sides.

I urged the operation the more strongly because the absence of symptoms denoting the extension of the tumour within the cranium was a ground for hoping that a thorough eradication might be practicable; but the reiterated positive opinion of a surgeon much older than myself, had so impressed the patient with the idea that his malady was beyond the resources of surgery, and the risk of immediately fatal hemorrhage had been so vividly portrayed to him by his family practitioner, that at first he seemed unable to believe that an operation could help him.

However, convinced that if left to himself he must soon die, and encouraged by the assurance that immediately fatal hemor-

rhage was very improbable, he acquiesced. His circumstances did not allow him proper attention at home, I took him into the Middlesex Hospital, and, on the 22nd, extirpated the tumour in the manner I had proposed. It was so friable that it could only be clipped away piecemeal with scissors. I then detached all the soft tissues from the orbital walls, scraped them, seared the cut end of the optic nerve and every suspicious spot with a hot iron, and plastered the whole raw surface with lint smeared with chloride of zinc paste.

The bleeding was less than might have been expected; one vessel at the apex of the orbit required a ligature. The report of the next few days will show how slight the reaction was.

23rd.—Slept at intervals during the night. P. 72.

24th.—Slept continuously after three o'clock (before this was disturbed by a delirious patient). Skin hot. Eyelids swollen. P. 80.

25th. P. 72. Skin cool. Complains of feebleness.

From this time I was absent until October 1st, when I found him convalescent, and learned that his recovery had been uninterrupted. Some small scales had exfoliated from the inner wall and roof of the orbit, and others continued to exfoliate for several weeks, leaving ultimately a free opening into the nasal passages. In the progress of cicatrization the eyelids were drawn in until they lined much of the front of the orbit.

The patient, whom I see every two or three weeks is now active and vigorous; he has resumed his occupation—the law. There is no appearance of any recurrence of the morbid growth in the scar; the deformity is hidden by a small green silk patch; and he has enjoyed for several months an amount of comfort and mental ease, for which he expresses the most lively gratitude.

The tumour consisted mainly of large spindle cells, and circular and roundly-oval cells filled with pigment, closely packed in a scanty, finely-granulated intercellular substance (Fig. 6). According to Virchow's anatomical definition it was, therefore, melanotic sarcoma. It appeared to have begun in the choroid which in parts was infiltrated with similar cells, and in parts wasted; then to have rapidly infected the sclerotic which was also infiltrated; and at an early stage to have escaped from the shrunken eyeball and enveloped it within its increasing mass.

The optic nerve immediately outside the sclera was shrunken; behind this point it was not traceable.

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## EXPLANATION OF PLATE.

FIG. 1.—A section of the centre of the glioma of the right eyeball, × 240. Small round and roundly-oval cells are seen embedded in scanty matrix, which has been rendered finely granular by chromic acid, but was transparent when fresh. The fibres probably belong to Müller's vertically-radial connective tissue fibre-system.

FIG. 2.—A longitudinal section of the right optic nerve inside the skull, near the commissure, × 240. It shows the presence of cells resembling those of the intraocular glioma, and the disappearance of the nerve-fibres.

FIG. 3.—A horizontal section of the left eyeball, displaying an axial glioma of the retina, which was separated from the choroid by a space filled with serum. The cut surface of the tumours is mottled with small fatty specks.

FIG. 4.—A transverse section of the swollen intracranial part of the left optic nerve, × 240. *a*. The bundles of nerve-fibres; *b*. the gliomatous growth originating in the interstitial connective tissue (neuroglia).

The above four figures illustrate case No. 1.

FIG. 5.—Exhibits the minute structure of the spindle-celled sarcoma of the temporal bone, described in case 2, × 240.

FIG. 6.—A section of the infecting, melanotic sarcoma described in case 3, × 240.

Fig 5

Fig 6

Fig 3.

Fig 2

Fig. 1.

Fig 4.

a

b

a

a

a

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a

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## TWO CASES OF UNIOCULAR AMAUROSIS.

By Jonathan Hutchinson, F.R.C.S.

The following cases,—examples of that rare and very interesting event, complete and permanent blindness of one eye only, with white atrophy of the disc,—are published by way of appendix to my report on this subject in a former number of this journal.*

By the careful clinical study of these cases, and of their points of resemblance to and difference from the far more common class in which symmetrical changes resulting in white atrophy and blindness take place, we may, perhaps, hope to throw some light on the true pathology of the latter. They are also of much importance in themselves in reference to the theory of embolism as a cause of certain forms of paralysis.

Case VI.—*Sudden Blindness of one Eye (permanent)—Ophthalmoscopic examination, seven months afterwards:—White Atrophy of Optic Disc and extreme shrinking of the Arteria Centralis—Qy. a case of Embolism.*

Alfred Bayley, æt. 18, was admitted as an out-patient at the Ophthalmic Hospital, Moorfields, March 19, 1866. He was a tall thin young man, looking pale but considering himself in good health. In 1861 he had a severe attack of "rheumatic fever." He was in bed for several months. The chief symptom appears to have been severe pain in his back, and it seems doubtful whether this was really rheumatism. He says that for nearly three weeks his knees were drawn up and his head bent forwards. He does not seem to have had any attack of paralysis either then or since. His heart's action is rather tumultuous and is easily increased on slight exertion, but not the slightest bruit

* See vol. iv, page 235, "Report on Cases of Amaurosis from Intracranial causes in which one Eye only was affected," Cases I to V.

can be detected. Last August, one afternoon, he was sorting some samples, when the left eye became suddenly dark. At first he thought that the eye was quite blind, but on trial he found that he could see a little with it. He went immediately to a surgeon. He was then in good health. He went to his occupation as usual the next day and had no fresh symptoms. From that time to the present he has remained in the same condition, but he thinks that latterly his eye has perhaps improved. He can see just sufficiently to count fingers. He says that several times his sight with the other eye (right) has become indistinct for a short time. On one occasion for about a minute he was in almost total darkness. This occurred last October. The blindness passed off as suddenly as it had been begun.

*Ophthalmoscopic Appearances.*—Left eye. The disc is very pale but not absolutely white, its margins are abrupt and marked with black pigment. The trunks of the vena centralis are easily seen, though not more than half their natural size. The trunks of the artery are so small that they can with difficulty be discovered. To the upper half of the retina (inverted image), I cannot trace any artery whatever. On the lower half of the retina some small arterial branches are indistinctly seen, but they cannot be traced much beyond the margins of the disc. Practically one might say that the main trunks of the artery can nowhere be traced. The choroid is normal. The optic disc is not materially depressed and it appears a little hazy.

In the right eye the conditions are normal excepting, perhaps, that the vein is too turgid.

Case VII.—*Sudden Blindness of one Eye (permanent).—Ophthalmoscopic Examination nine years afterwards.—White Atrophy of Disc.*

Sarah Benevelt, æt. 20, was admitted under my care, at the Hospital for Skin Diseases, on March 15, 1866. She was suffering from lupus, but by accident I discovered that she was quite blind of one eye. The following are the facts as regards the unsymmetrical amaurosis :—

Nine years ago, on getting up one morning she found she could not see on one side.

She was then in fair general health, but she believes that

it was at the time when she suffered from chorea. She says that she was ill for six months with the latter, but not severely.

She has never had rheumatism, has never been paralysed, nor had any sort of fit.

She has had lupus on the face for twelve years past.

She speaks very definitely as to her discovery that she could not see on one side; and it appears probable that the failure of sight was quite sudden.

She has no cardiac murmur, and is at present in fair health.

The left eye is perfect, its disc is of healthy redness. The right disc is of a creamy white, very conspicuous, its margins everywhere quite abrupt, excepting on the side next the yellow spot, where the choroid is a little notched. The trunks of the vessels are beautifully clear and distinct on the disc and at other parts.

Both artery and vein are diminished to less than half their normal size. The artery bears its normal relative size to the vein.

The size of the artery in this case seems to put out of question the hypothesis of embolism which the history of the sudden occurrence of the blindness might have suggested. In this feature the case differs from the preceding one. Possibly, however, some vessel, other than the arteria centralis, was plugged by an embolus. The girl had suffered from chorea, and I believe that my friend, Dr. Hughlings Jackson, holds a strong opinion that embolism is often the cause of that curious affection.

## CASE OF CANCER OF THE EYEBALL COMMENCING IN THE CILIARY REGION, AND PRESENTING ITSELF THROUGH THE IRIS.

By George Cowell,

*Clinical Assistant at the Royal London Ophthalmic Hospital, Surgeon to the St. George's and St. James' Dispensary.*

Wm. L., of healthy appearance, a joiner by trade, æt. 24, presented himself at the hospital on August 9 last. The sight of his left eye had been gradually failing for, as nearly as he could remember, six or seven months. The first defect that he had noticed was that the sight of that eye had become "foggy."

On examination it was found that with the affected eye he could with difficulty count fingers, and that by slightly rotating the head to one side, so as to use the inner peripheral portion of the retina. The globe appeared generally bright and healthy. In the plane of the iris, and presenting through it, was a cyst-like growth, of a *yellowish-grey* colour, irregularly oval in shape, and about 3‴ by 1½‴ in diameter. Its position was outwards, and somewhat downwards, and extended from the ciliary border to within less than a line of the pupillary margin. The rest of the iris was healthy, and acted well, together with the free portion to the pupil side of the growth. The pupil was quite round. The margin of the growth was perfectly defined, giving it the cyst-like appearance mentioned above. The anterior chamber was not diminished in the slightest degree. The patient had first perceived a "spot" in the iris four months ago. There was no pain nor irritation whatever, and none had been present throughout. There was no history of injury and no history of malignant disease in any member of his family. In the conjunctiva there was one large and tortuous vein, commencing about a line from the margin of the cornea, opposite the growth, and going in a direction directly backwards.

After the instillation of atropine, the pupil became freely dilated, but was no longer round, being encroached upon by the growth, which could now be seen extending backwards behind the iris. Examination with the ophthalmoscope showed the tumour to be of a rounded form projecting somewhat into the

axis of vision, so that the yellow spot could not be seen, and barely the disc of the optic nerve. The lens, though transparent, was pushed inwards and indented, and the growth with a pigmentary covering could be seen firmly pressing against it.

As the tumour was undoubtedly of a malignant nature, and slowly increasing, and the eye as an organ of vision useless, it was recommended that a radical cure was only possible by extirpation without loss of time. This was agreed to, and accordingly, after obtaining a sketch of the appearance presented, I, on August 16, removed the globe, and a fortnight later the patient was fitted with an artificial eye.

*Dissection of the Globe.*—On making a section of the eyeball, which was done in such a way as to bisect the tumour, as well as the cornea, a grey, translucent medullary growth, about the size of a small hazel nut, was found *firmly* attached by a narrow pedicle to the sclerotic, close to its junction with the cornea. The choroid and retina were in apposition, and had a distinct and healthy appearance, being apparently unimplicated by the disease, beyond being detached from the sclerotic. The outer surface of the growth, from the pedicle to a distance of $2\frac{1}{2}'''$, was closely pressed against the sclerotic, but not adherent to it; and beyond this point the choroid and retina were reflected, at right angles to the sclerotic, over the surface of the tumour, which pressed the ciliary processes firmly against the lens, and pushed it inwards into the position seen through the dilated pupil before the operation. There was no deposit of any kind in the other textures of the globe.

The section of the tumour showed several cysts of various sizes, filled with a translucent substance, but the outer part of the growth near its attachment was much more dense. There was one small streak of pigment near the centre of the mass. Mr. Hutchinson kindly gave me the result of his examination of a section under the microscope. The cells were numerous, and of various sizes, with contained and free nuclei. Most of them were round or oval. The nuclei were usually very large.

*Remarks.*—The position of the growth in this case was an unusual one. It was undoubtedly most strongly connected with the sclerotic, just at the thickened portion where it joins the cornea, by a narrow pedicle less than a

line in diameter. Whether it originated or not in the sclerotic, or in some other structure of the ciliary region, it is impossible to say. It certainly did not commence in the ciliary processes, as they, though displaced, were free from disease, besides in that case its development would probably have been of a more pigmentary character, and would have taken place within the choroid instead of between it and the sclerotic, and there would have been more disturbance and irritation in the eye, as in a case reported by Mr. Hulke.* Primary intraocular cancer of the eyeball is almost always within the choroid, sometimes probably within the retina also. Amongst the valuable collection of eye preparations, presented by Dr. Bader to the Museum of the Royal College of Surgeons, there are 17 cases of cancer of the eye represented. In all of them, where the tunics of the eye were not obliterated, and it was possible to determine the primary seat of the disease, the tumour was situated within the choroid, and the retina was more or less detached, and in all but *one* of these cases the fundus of the eye was the original seat. It is both rare to find this disease, commencing in the neighbourhood of the ciliary region, and rare to find it commencing from the inner surface of the sclerotic. Amongst the older preparations in the College Museum, there are two of medullary tumours, springing from the interior of the sclerotic, and pushing forwards the choroid and retina, but both originated in the posterior hemisphere of the globe. Amongst the 11 cases of cancer of the globe, reported by Mr. Hulke, in the Ophthalmic Hospital Reports, vols. iii. and iv., in none was the tumour external to the choroid.

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For the notes of another case almost precisely similar to this, the reader is referred to page 177.—Eds.

* Ophth. Hosp. Reports, Vol. iii., p. 284.

## A CLINICAL REPORT ON HERPES ZOSTER FRONTALIS SEU OPHTHALMICUS (SHINGLES AFFECTING THE FOREHEAD AND NOSE.)

By Jonathan Hutchinson, F.R.C.S.

This most interesting disease has as yet received but little attention from writers on Skin Diseases, and as far as I am aware scarcely any from ophthalmic surgeons. Rayer has recorded a single case; in the "Atlas," published by Danielssen and Boeck there is an excellent portrait of it, and a wax cast having reference to it is in the Guy's Hospital collection. The disease is, I am persuaded, more frequent than is generally supposed. In proof of this I may mention that during this last year no fewer than three patients have consulted me in private on account of its effects. About three years ago a little boy was brought to my house shewing the disease in its acute and early stage.* At different hospitals, the London, Metropolitan Free, and Ophthalmic, a considerable number of examples of it have come under my care. These I now propose to group together, and in doing so I shall also mention all the cases which I have found recorded by others.†

I have found most surgeons very incredulous as to this disease, and free in assertions that they had never seen it, and that it must be extremely rare. My conviction is that it is often misnamed. It is often considered to be erysipelas. Three patients who came to me with the unmistakable marks of herpes on one side of the forehead had been treated for a disease which had been said to be erysipelas, and several others in my series had also had a

* A portrait of this boy was taken for me by Mr. E. Burgess, and was subsequently published by the New Sydenham Society, Portrait 8, Fasciculus III.

† In my search for other cases I have had time only to refer to the leading treatises. Very probably a considerable number might be found scattered through periodical literature.

similar diagnosis given. Yet it is easy enough to distinguish the one from the other, if attention be once drawn to their differences. Herpes frontalis is always limited to one side, never transgresses the median line of the forehead and nose. It never affects the cheek, although there may be some sympathetic œdema of this part (œdema of contiguity). There is less general swelling of the skin than in erysipelas, and in some cases very little. The vesicles of herpes are smaller, more defined, more numerous, and altogether much more conspicuous and pronounced than are the bullæ of erysipelas. There is much more pain and much less constitutional disturbance in herpes than in erysipelas. The strictly unilateral character of the one contrasted with the irregular location of the other, is, however, the most reliable feature for the purpose of ready diagnosis.

Herpes almost invariably leaves scars, often deep ones, and by the arrangement of these (unilateral) it is usually easy to recognise a patient who has suffered from the disease even years after its occurrence.

For purposes both of prognosis and treatment, it is very desirable to make a correct diagnosis between herpes frontalis and erysipelas of the scalp. A patient with the former may be confidently assured that there is no danger; that the disease will subside after a time, and that he will have neither a relapse nor a recurrence. Two ladies who came to me scarred by herpes, believed that they had had erysipelas, and would be very likely to have it again, and were greatly relieved when told that they might go into the air as usual, and were quite certain never to have another similar attack. On the other hand it is well to warn a patient with herpes that very likely the eye may inflame, and that, if it does, serious mischief to the organ may result.

The case of James Morgan (page 196) is, I believe, the first in which inflammation of the deeper structures of the eye (iris, &c.) has been observed. This patient was under my care in 1861. Since then I have seen several cases in which

the cornea, sclerotic and iris became involved in inflammation. As a rule, I think the eye does not inflame until the eruption is at its height, or already beginning to decline. In one case, however, a single nodule of lymph near to the pupillary edge showed itself in the early stage, and without any ulceration of the cornea. More usually the ulceration of the cornea is extensive, and often it prevents a satisfactory inspection of the state of the iris. There is always great congestion both of conjunctiva and sclerotic, and this congestion, as well as the corneal ulceration, is very slow in disappearance. The pupil, even when there is not much lymph visible, is always very sluggish, and in several cases I have found it impossible to make the iris act by atropine, even by strong solutions frequently repeated. I have never seen hypopyon in connection with this form of ophthalmia, nor does the other eye seem to suffer.

According to my experience herpes zoster frontalis is more frequent in the aged than in the young, and also more severe. The liability of the eye to suffer also appears to be much greater in the old.

When the disease has subsided, the eyeball is usually left somewhat anæsthetic, though perhaps at the same time liable to neuralgic irritability. In this it shares with the skin, which, although perhaps very painful, is always numb as regards common sensation. In the after stages the patients often complain that the skin feels "numb and stiff like parchment." I have often proved with the æsthesiometer that sensation was much less acute in the affected part than in the opposite forehead. This indeed might be expected from the disorganisation of the papillæ which the scars imply. I think, however, that it exceeds that which this result may be supposed to explain, and that it is not improbably dependent also in part upon some change in the nerve trunk or nerve centre.

Herpes zoster frontalis, like herpes zoster of the trunk, occurs but once in a patient's life, goes through regular

stages of advance and decline, is never symmetrical,* confines itself accurately to the parts of skin supplied by certain known nerves of sensation, and lastly, is not contagious. Thus in some features it resembles an exanthem, in others a neurosis. From both these, however, it differs in most marked features; indeed as yet these forms of herpes stand alone as an unique type of disease, perhaps at once the most interesting and the most puzzling in the whole domain of pathology.†

There can be little doubt that the local processes of inflammation in the skin and the eye are produced directly through the medium of the nerve, in this instance of the ophthalmic division of the fifth (some or all its branches). At what part of the nervous system the irritation begins, however, we are quite in the dark. I can see no arguments in favour of the belief that it is produced by the vaso-motor rather than by the sensory trunks. It appears always to follow accurately the distribution of the latter. Not only is it a constant fact that but one division of the fifth nerve is involved, but it is a very common one to find only some twigs of the ophthalmic division affected. Thus very frequently the trochlear and nasal branches escape. I have never seen the converse, *i.e.*, the nasal and trochlear affected, whilst the frontal escaped. There must be some reason for this, and also for the curious fact that the second division of the fifth scarcely ever produces herpes, if we except the herpes labialis, which comes into a different category. We scarcely ever see the lower eyelid and the cheek affected by herpes.

* I am aware that in exceedingly rare instances herpes zoster of the trunk does occur symmetrically, and in others, equally rare, twice in the life of the same patient. These exceptions are however so exceptional that they only serve to give the general rule greater prominence. I have, as yet, never known herpes zoster frontalis either to be symmetrical or to occur twice to the same patient.

† For a more full explanation of the nosological riddle which herpes zoster presents see a lecture by the writer in the third volume of the London Hospital Reports.

This singling out of one particular nerve-branch might seem to imply that the irritation, whatever it is, attacks the nerve-trunks after their subdivision. It is possible that it may be brought to bear upon them through the medium of the vaso-motor ganglia. This conjecture is very different from the one which would attribute the whole production and localisation of the disease to vaso-motor filaments. Other arguments might be held to support the conjecture that the irritation starts from the cerebral ganglia of origin for the nerve concerned.

As regards treatment, whilst our pathology is so uncertain, we can allege nothing with confidence. I have always been in the habit of ordering quinine, and using any simple local application which may seem most appropriate to the stage of the eruption. Lead lotion at first, or free applications of oil, or if the pain be very severe, of laudanum, are all useful. In a recent case Mr. Bowman has, I believe, performed subcutaneous section of the supra-orbital branch, and with some relief to the pain. Very probably section of this nerve would relieve the pain felt in the skin of the forehead, and the decision as to whether or not it can do this would clear up one little point as to its nature, for it is possible that after all the pain felt is produced by central changes, and is as regards the peripheral parts only "a referred pain."

An attack of ophthalmic shingles often constitutes a very serious illness. It entails much severe pain, and although the vesicles will disappear in ten days or so, yet the pain may last much longer, especially if the eye be affected, or if the skin be deeply ulcerated. In a severe case the patient may be confined to bed for a week or a fortnight, and the irritability of the eye may last for months.

CASE I.—*Herpes Zoster Frontalis of the left side, involving the whole ophthalmic division of fifth nerve.—Inflammation of the left Eye. —Ulcers in Cornea and Iritis.*

George M., æt. 63, a stout, florid man, applied at the Ophthalmic Hospital in September, 1861, on account of slight conjunctivitis of three days' duration. He was prescribed for on a Thursday. During the Thursday night he scarcely slept at all on account of severe pain in the scalp. On the Friday, at noon, the left half of the scalp was "all over pimples."

He attended at the hospital again on the following Monday, September 3rd, and then showed a characteristic rash of herpes zoster. The patches were almost confluent. They covered the whole upper lid, and passed outwards and downwards into the upper part of his whisker, and inwards and downwards over the whole left half of the nose to its tip. On the scalp the eruption involved the whole left half as far back as a line drawn from the back of ears over the vertex. On the nose and the scalp it was limited most exactly by the median line. The lower eyelid was œdematous, but free from vesicles. The cheek was not affected, nor the ear, nor the parotid or the post-aural regions.

He was a stout, healthy man, and said he had never had any illness whatever. Tongue clean; appetite bad.

The eruption was very characteristic, but of those who saw it, one gentleman called it eczema, and another erysipelas. From the latter it was easily distinguished by its vesicles being in groups with healthy portions of skin intervening; from the former, by the size, confluence, &c., of its vesicles, and by the bloody crusts left by those which had burst.

There were no ulcers or patches on the conjunctiva, but that membrane was swollen and œdematous.

On September 6th the inflammation of the eye had increased, and there was a deep ulcer near the margin of the cornea.

After this date the rash quickly declined, but the forehead was for long ulcerated and painful, and his eye very irritable. The following note describes his condition two months later:—

*November 14th.*—His left nostril has been throughout a little sore. There are extensive red scars of the eruption on the scalp. His eyelids (left) are still relaxed, and the conjunctiva much congested. The motions of the globe are perfect. He com-

plains much of pain in the affected region of the scalp; but the pain sometimes quite leaves him. He sleeps well on the whole. The globe is slightly prominent. The cornea is superficially opaque in patches. The pupil is irregular, and a thin layer of lymph occupies it.

He complains that his left side of head feels tight, as if bound or pressed, though partially numb. Mr. Dixon and I examined him carefully, and it was quite certain that over the whole distribution of the ophthalmic division, he had very much less perfect sensation than on the other side. The right side was normally sensitive; but on the left he often stated that he did not feel the prick of a pin at all.

He has had a severe crop of boils over the brow, and the irritation, both of skin and eye, has subsided only very slowly.

The inflammation of the eye seems to have involved, in some degree, most of the tissues of the globe, cornea, conjunctiva, sclerotic, and iris.

CASE II.—*Herpes Zoster on the left Forehead and mid-region of left side of Nose—Anæmia—Eye not inflamed.*

Mrs. Kimpton, æt. 26, a tall, thin, very delicate-looking woman, applied to me on Dec. 17th, 1861, on account of a rash on her forehead. On the left side of her forehead, extending upwards amongst the roots of the hair nearly to the middle of the head, were characteristic patches of herpes. The vesicles were very small, and as usual collected in oval groups. The lowest group was situated exactly over the supra-orbital foramen. There were none on the temple or the upper lid. The mid-region of the left side of the nose was covered with vesicles, extending exactly to the median line and no further. Neither the lower part (ala) nor the upper part of the side of the nose were affected. The upper margin of the patch was exactly on the level with the angle of the eye. The eye itself was nowise affected. Pupils of equal size, and sight good.

She was exceedingly pale, and whilst I was questioning her she almost fainted. She considered that she had enjoyed usual health until a fortnight ago, when she began to suffer much from headache. The headache was all over, not limited. She slept very badly, chiefly on account of headache, and lost her ap-

petite. She also had soreness of the scalp, and the hair came out. (She still has a good head of hair.) Her menstruation had always been regular. Her youngest child was one year old, and was weaned five months ago. The bowels were now costive. She had not had any sickness, but for the last few days had been very giddy, so much so that she was often afraid she should fall down stairs.

Six days before her admission the vesicles began to show themselves amongst the hair. There had been some local tenderness before, but not much. No tenderness or neuralgia was noticed on the side of the nose before the eruption. The eruption on the nose began three days after that on the scalp. Tongue clean; papillæ not unduly developed.

This patient recovered from the attack without any inflammation of the eye.

Case III.—*Herpes Zoster affecting the parts supplied by the Frontal and Supra-trochlear branches of the first division of the left fifth Nerve—Eye not inflamed.*

The subject of the following case was brought to me on March 29, 1862. His eruption was so characteristic that I had a coloured portrait taken. This was subsequently adopted by the Council of the New Sydenham Society for their Atlas, and has been faithfully copied by Mr. Burgess in plate number VIII., which well displays the features of this peculiar disease.

William Woolgar, æt. $3\frac{1}{2}$, previously in good health, a stout but pale child, living in the City. He was, as his mother states, liable to occasional headaches. On Wednesday of last week he first began to feel ill, and complained of headache, and put his hand to the right side. He had several restless nights, cried out in his sleep, and his appetite left him. No redness of the skin was noticed until Thursday morning. On Friday morning he was sick and vomited; he had not been so before.

The first vesicles were observed a little above the eyebrow, and almost over the trunk of the frontal nerve.

He was brought to me on Saturday. The whole right forehead, right upper eyelid, and right anterior half of scalp were involved. A few vesicles extended down the right side of nose. The upper eyelid was considerably swollen, the lower scarcely

at all. All the affected tract of skin was of a bright pink colour from congestion, and covered by vesicles more or less grouped. The conjunctiva was suffused and congested, but there was no material intolerance of light, nor was the pupil altered in size. The skin was tender to the touch.

The boy looked pale, but his tongue was clean. He had seemed better since the rash came out.

The rash remained out for about a week, gradually receding. No fresh vesicles appeared after the first few days. It was three weeks before all the ulcers had healed. Beyond the general irritability and conjunctival congestion, there was no inflammation of the eye.

CASE IV.—*Shingles occurring on the Right Side of Chest and Left Forehead at the same time, and in the same patient.*

Joseph Bond, aged 56, the subject of severe chronic bronchitis and asthma. I had operated on him for the radical cure of hernia about two months before, after which he had considerable constitutional disturbance. This, however, had wholly subsided, and he was now in usual health.

On July 17th he came to me with a commencing half-zone of shingles on the *right* chest, extending from the spinous processes behind to the middle of the sternum, and taking the course of the fourth dorsal nerve. Great pain had preceded the appearance of the eruption. On the following day a similar eruption showed itself on the *left* forehead. It covered the left upper eyelid and the eyebrow, and extended backwards over the anterior two-thirds of the scalp. The conjunctiva was congested, and the eye irritable. Both on the chest and the scalp the characters of the rash were subsequently developed in full perfection.

I have no note of his progress later than the seventh day, when the rash was fading. There were no vesicles on the nose and no inflammation of the eye.

CASE V.—*Herpes Zoster of the Frontal and Trochlear branches of the Ophthalmic Division of the Fifth Nerve.*

This patient was under my care at the Ophthalmic Hospital. A stout leucophlegmatic man, a great smoker, a clerk in a City office.

For ten days he had suffered from darting pain just above his left eye, and over the mastoid process on left side. The pain over the eye was such that he several times said to his employer he "could not tell what was coming to his eye, he had so much pain." No one could see anything. There was neither swelling nor redness.

Last Sunday he walked about thirty miles (this was about nine days after the frontal pain had begun). On Sunday night he noticed that there was swelling about the eyelid. Slept badly, and in the morning, Monday, found some vesicles over his eyebrow. The first seen were on the upper eyelid and eyebrow; afterwards on the side of nose as low as its middle, and over the left half of scalp. The pain continued, and he had several very bad nights, but kept at work. It was not till Thursday that I saw him.

Before the rash came out he had a good appetite, but since Monday (day of outbreak) he has felt sick every day, and eaten very little, and has felt weak all over. Sometimes his sight fails for awhile. "The day before yesterday he had to catch hold of the counter, or he would have fallen." Bowels costive at first, but open by medicine.

The rash was very copious, and very characteristic. It covered the left upper lid and the left half of forehead, and anterior three-fourths of scalp. A few spots occurred on the left side of the bridge of the nose. None on the lower lid, or cheek, or temple. There was much inflammatory œdema, the greatest swelling being of the forehead and upper eyelid, but the temple, lower eye-lid, and cheek being also involved. The eye was closed by the swelling of the lids. On opening the eye the conjunctiva was seen to be much swollen and chemosed, but the eye itself was not inflamed: cornea and iris brilliantly clear. The inflammation was very unusually severe, and the man before coming to the hospital had been told that the disease was erysipelas. Not a single spot crossed the median line to the right side. Many of the vesicles contained bloody serum.

I prescribed an emetic, to be followed by quinine. Lead lotion to be applied to the part.

On Monday the disease had very much abated, and he could open his eye.

I have unfortunately no further note as to the progress.

In this case the unusual duration of premonitory pain in the part, and its severity, are worthy of note, as is also the fact that he had much aching pain about the mastoid process of the affected side.

CASE VI.—*Herpes Frontalis of Right Side—No Vesicles on Nose, and no Inflammation of Eye.*

Mrs. Barnes, æt. 64, a pale, thin woman, but considering herself in good health, admitted July 9th, 1863, when the following notes were taken:—

"She has been liable to pain in the back of the left side of head. Last Sunday she had severe pain in the right side of head. It does not appear that this pain was at all confined to the frontal region. She locates it rather in the occiput and neck. On Monday she had soreness in the forehead, and thought it was swollen. On Tuesday the rash showed itself.

"She now has characteristic herpes over the right frontal region. Vesicles are found amongst the hair far back on the scalp. All are confined to the right side. The largest groups are in the eyebrow. The lid is swollen. No vesicles on the side of nose, but a portion of œdematous skin extends down the side of the bridge of nose close to inner canthus. The groups are not very thickly set, and the swelling is not much.

"Sensation does not appear to differ on the two sides."

This patient recovered well, the eruption having passed through its usual stages. She had no inflammation of the eye.

CASE VII.—*Shingles on the Forehead and Nose, with Inflammation of Conjunctiva.* (*Imperfect Notes.*)

John Thomas, aged 17, a sailor, of dark complexion, and in good health, applied at Moorfields on April 28, 1865. On one side his forehead and side of nose were covered by the vesicles of herpes. There was great œdema, and the lids were closed by it; but there was not a single vesicle on the lower lid. The conjunctiva was much inflamed, and there was much mucous discharge.

He said that his attack had begun a week ago by severe pain about the eyebrow and discharge from the eye, and that the

rash did not show itself till three days later. He had been very giddy during the last day or two, and whilst I was questioning him he was so giddy that he could scarcely reply, and at length fainted.

Unfortunately I have no further note as to this case, and cannot state the exact condition of the eye.

CASE VIII.—*Shingles of Forehead and Nose, with Inflammation of Cornea and Iris.*

John Anderson, aged 69, a tailor, in excellent health, applied at Moorfields on May 10th, 1866. His left forehead and upper eyelid and left side of nose, to the very tip, were covered with herpes vesicles. There were none on the lower eyelid. The eruption was very free, and there was much œdema. On the scalp the eruption extended as far as the vertex, nowhere, however, transgressing the middle line. He said that his symptoms had commenced a week ago by severe pain in the middle of his forehead and down to the tip of his nose. This pain he described as continuous and "numbing." In the course of the same day he had a shivering fit. The next day he observed a few pimples on the forehead, and at night these pimples had become small blisters. A day or two later he had another rigor. When admitted on May 10, although his conjunctiva was much congested, his cornea was quite clear. On the 14th I again noted that the cornea was not involved. On the 21st, however, there was superficial ulceration over almost the whole surface of the cornea, the ulceration being deepest at the lowest part. The conjunctiva was much thickened, and in a state of chemosis, and there was free muco-purulent discharge. The eruption was now disappearing, but he had still much pain. At this time he was very ill, owing to the pain and loss of rest which he had endured.

On the 24th the inflammation of the eye was less. Owing to the state of the cornea we had been unable to see the iris accurately, but it was evident that there was some lymph near its pupilary edge. From the 14th atropine had been used, and scarcely any dilatation had been produced. On several occasions a four-grain solution had been freely put in every quarter of an hour for four times, but without effect.

After the end of May the condition of things continued slowly to improve, but the eye long remained congested and irritable. At the present time, Oct. 15, the man bears the marks of the rash in deep pits over the forehead and side of nose; his eye is still very much congested, but without active disease. The cornea is superficially hazy, and the pupil, which is of medium degree of contraction, does not respond at all to the influence of atropine.

CASE IX.—*Shingles of Forehead and Nose, with Inflammation of Cornea and Iris—Long-continued Irritation.*

Miss B., a lady aged about 68, of Luton, consulted me in the summer of 1864 on account of an inflamed eye. She said she had "just recovered from an attack of erysipelas of the head during which she had suffered most severely." As her left forehead and side of nose were covered with the scars of herpes, there could be no doubt as to what the nature of her illness had been. I assured her, to the great relief of her mind, that she was not likely to ever have that kind of "erysipelas" again. Her eye had been inflamed, and was still very irritable and much congested. The cornea was extensively but superficially opaque, and she had no useful vision. The globe was tender to the touch, and seemed a little harder than natural. The skin of the forehead was numb, and at the same time tender; she complained that it felt stiff, as if of parchment.

During the next year I repeatedly saw Miss B. Her eye recovered very slowly from its irritability, and the opacity of the cornea was such as to prevent all useful sight. The pupil was fixed and did not dilate with atropine, although there did not appear to be many adhesions. At present the tension, both of the affected eye and of its fellow, is decidedly increased.

CASE X.—*Shingles of Forehead and Nose, with Inflammation of Cornea and of Iris.*

Mrs. M., aged 66, a rather delicate lady, from a village in Hertford, came under my notice in almost precisely similar conditions to those of the preceding case. She had had what she was told was "erysipelas of the forehead," and had been very ill. The

eye inflamed, and being very anxious about this she was brought up to town in a carriage as soon as she could safely leave her room. I found the scars of herpes over the forehead, upper lid, and side of nose. The eye was still, six weeks after the attack, much inflamed, and the cornea extensively hazy. She was delighted to learn that it had not been erysipelas, and that she would not be liable to its recurrence. We allowed her to go into the air, and gave tonics, and her general health much improved. The cornea cleared to a great extent.

Case XI.—*Shingles of Forehead and Nose, with Superficial Ulceration of Cornea.*

In January, 1866, Dr. King, of Hackney, brought to me, on account of commencing cataracts, a very healthy old gentleman of 60. His left forehead and side of nose showed the scars of herpes, and in the cornea were some thin opacities. The attack had occurred a year before, and had been attended by the usual symptoms.

Case XII.—*Shingles of Forehead only, with Implication of the Eye.*

My friend, Dr. Markham, suffered from this curious disease this year, and, as his case was mentioned, I believe by himself, in the journal of which he was then editor, I cannot do better than extract it in his own words. It affords, moreover, an interesting illustration of the value of portraits of skin diseases, especially of rare diseases. I am very glad to be able to add that in Dr. Markham's case the oculo-nasal nerve was not affected. No vesicles appeared on the nose, and the eye did not inflame. He, at present, has the deep scars of herpes in the forehead, but the eye is quite sound.

The following is from the "British Medical Journal," vol. i, 1866, p. 470:—

"A few months ago, at a meeting of the Council of the New Sydenham Society, two new plates of the series of skin diseases were presented to the Council for approval. One of these plates, representing a specimen of herpes zoster of the head and face, excited a little amusement among some of the members. 'Who had ever seen the disease in such a part? Surely it was

unnecessary to depict so rare and far-fetched a complaint.' Curiously enough one of the Council, Dr. Markham, who had had his joke on the occasion, was himself last week pronounced by his friend Dr. Stewart (another of the unbelieving ones), to be 'a splendid specimen of that very disease we were joking about a few months ago at the Council of the Sydenham Society.' Herpes zoster of the head and face is, however, no joke to the patient. A man need wish his worst enemy no worse week's or fourteen days' excitement than that of an attack by it. In the present case the disease was limited to the course of distribution of the left supra-orbital nerve, and shewed, throughout, its distinctive nerve character. Five days before the eruption appeared there was constant neuralgia of the aforesaid nerve and hemicrania. Considerable itching and several hardish and painful subcutaneous elevations preceded the vesicular eruption. The eruption was markedly limited to the left side of the forehead and head, and the root of the nose, and to the left upper eyelid."

In the above account Dr. Markham's description of indurations preceding the vesicles is of special interest. This form of herpes almost always leaves scars, and no doubt the depth at which the inflammatory process begins is the chief cause of this. It is, perhaps, probable that the thicker the portion of skin is which is attacked, the greater the risk of deep scars, since the deeper are the papillæ placed in which the diseased process begins. Where the skin is thin scars rarely result.

Case XIII.—*Shingles of Forehead and Nose, with Inflammation of Conjunctiva and Iritis.*

My friend, Dr. Woodman, then the Resident Medical Officer at the London Hospital, was kind enough, about two years ago, to show me a good example of this disease. The patient was a girl of about 16, under Dr. Parker's care. The eruption covered her left forehead and side of nose. The eye was much congested, and there was a single distinct mass of lymph on the iris. The disease passed away favourably, but left the cornea slightly opaque, and the pupil adherent at several places.

CASE XIV.—*Shingles of Forehead only, without Implication of the Eye.*

Professors Danielsen and Boeck have published in their excellent series of Portraits of Skin Diseases a very good illustration of this disease, probably the first ever delineated. It shows the head of an old man, with the right half of the scalp covered with vesicles. There are none on the nose, and the eye is not inflamed.

CASE XV.—*Shingles of the Forehead—Notes Imperfect.*

Rayer has mentioned a single case. The patient was a man aged 47. The left forehead and side of scalp were the parts affected. There is no information as to the nose or eye.

CASE XVI.—*Shingles of Right Forehead and Side of Nose—Inflammation of Cornea and Conjunctiva and Iris.*

Dr. Broadbent has very kindly just placed at my disposal the notes of the following case:—

The subject of it is a young officer, aged 23, in good health. Dr. Broadbent saw him for the first time on the fourteenth day after a severe eruption of herpes on the right forehead. It extended "half way down on the side of the nose," and was for the most part sharply defined by the median line. Respecting the eye, Dr. Broadbent writes:—

"The conjunctiva is generally injected, with here and there a small red patch. The sclerotic also is injected. The cornea is transparent, but not so bright as the other. The iris is slightly dull, acting on exposure to light, but only slowly as compared with its fellow. The pupil is circular; a trifle larger than the other, and not having the clear black appearance of the healthy pupil, the media, I suppose, being hazy. There is no marked photophobia. The sight is improving, but at present objects are dim, and he cannot make out large ordinary print at all."

CASE XVII.—*Herpes Frontalis—No Vesicles on the Nose, and no Inflammation of the Eye.*

This case has been mentioned to me by a medical friend. The subject of it was a young girl who had a sharp attack of herpes on the forehead. No vesicles appeared on the nose, and the eye, beyond a little congestion, did not suffer.

CASE XVIII.—*Herpes on the Forehead and side of Nose, chiefly on the latter—Inflammation of Eye—Ptosis and Dilated Pupil.*

Whilst these sheets were going through the press, another, and perhaps the most instructive case that I have ever seen, has just come under my notice. Yesterday (November 1st) a woman, aged about 60, came to me at Moorfields, having the right half of her nose scarred most deeply, from the root to the tip, by herpes. On her forehead are a few scattered and characteristic scars, but the stress of the disease has fallen on the trochlear and nasal nerve-territories, and this to a degree which I never before witnessed. It suggests the possibility that one may yet see a case in which these nerves suffer alone, and the frontal wholly escapes. This patient reported that she had just recovered from "a very bad attack of erysipelas." She has not the slightest perception of light. The cornea is hazy, but without any dense opacities; the pupil is dilated to twice its normal size, and absolutely fixed. There appear to be a few iritic adhesions, but they are small, and the pupil is not closed. The iris has lost its lustre. The globe is not hardened. The upper lid droops so as to quite cover the eye, but she can raise it a little. None of the recti muscles are paralysed or materially impaired.

The occurrence of a dilated pupil in connexion with herpes is new to me, as is also that of ptosis. Both are no doubt connected with impairment of the third nerve. Dr. Broadbent has just published a very interesting case of herpes affecting certain parts of the arm, and followed by muscular impairment, and an almost exactly parallel one to that which he mentions has recently been under my own care. Hitherto herpes has been supposed to affect the sensory nerves only, but we have here

three examples of motor paralysis following it. In all the cases which I have seen in which the eye was affected, paralysis of the iris and total immobility of the pupil ensued.

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In Mackenzie's renowned work,* I find under the head "*Herpes affecting the Eyelids*," the following:—

"There is scarcely any cutaneous disease which may not be seen occasionally on the eyelids. Herpes I have often met with, both in children and adults. It runs its usual course of about a fortnight, leaving pits like those of small-pox. Not unfrequently it attacks the cornea, a vesicle having its seat there, ending in an ulcer."

Dr. Mackenzie does not mention iritis, nor does he specify the peculiarity of the eruption in affecting the *upper* eyelid only, nor allude to its extension on the forehead and scalp, and to the side of the nose. Possibly some of the cases which he refers to were not instances of true herpes zoster, at any rate not of frontal zoster.

The following is the account, extracted from the Catalogue, of the wax model in the Museum of Guy's Hospital:—

"163$^5$. Herpes ophthalmicus (brow shingles) or herpes occurring in connection with ophthalmia.

"Case of a boy, æt. 5, who was attacked with inflammation of the eye, and at the same time the herpetic eruption appeared. Duration a week when the model was taken, 1857.

"163$^6$. The same a few days afterwards."

The wax model to which this refers shows the left eyelids of a child. Both the upper and lower eyelids are very much swollen, tense, of a dusky red colour, and present numerous clear vesications. There are more vesications on the upper than on the lower eyelid. There are a few on the side of the nose close to the inner canthus, and about a dozen extend from the outer angle towards the ear. How far they went towards the ear cannot be seen in the model, as it represents only the front of the face. As to what the condition of the eye was we have no information.

I have never seen an example of the very rare disease illustrated in this very valuable cast. The eruption does not follow

* 3rd edition, page 149.

the known distribution of any nerve,* and is quite different in locality, if not in kind, from the disease I have been considering. The application of the epithet "brow shingles" to this cast is curious, since it implies a familiarity with other cases of true frontal shingles, whilst in this instance it is so far inappropriate that there are no spots above the eyelid itself.

The Guy's Museum does not, as far as I can ascertain, contain any cast or portrait of frontal herpes.

I extract the following from Professor Hebra's work on skin diseases, now in course of translation for the New Sydenham Society :—

"(*a*) *H. Zoster capillitii.*—This often appears on the forehead and scalp, in the course of the *supra-orbital*, a branch of the first division of the fifth nerve passing from the supra-orbital notch upwards to the top of the head. In some of these cases the eye also is affected; the vessels of the conjunctiva and those which supply the cornea being injected, and severe pain being complained of by the patient. Under these circumstances, indeed, the mobility of the iris may be so much impaired that the disease may simulate an *Iritis.*"

Hebra does not describe any form affecting the eyelids only, nor does he say anything of the side of the nose, excepting in connection with herpes of the cheek.

* My friend Mr. Waren Tay has suggested to me that this form of true *palpebral* herpes may perhaps be explained as due either to the lachrymal nerve or the orbital branch of the second division of the fifth. This latter gives or receives a branch or branches from the lachrymal. It is thus quite possible that in some individuals both the two eyelids and the temporomalar region may receive twigs from the same nerve. We must, of course, allow for some irregularities in the distribution of sensitive nerves.

TABULAR STATEMENT OF EIGHTEEN CASES OF HERPES FRONTALIS—SEU OPHTHALMICUS.

| No. | Name, Date, Reference. | Age. | Health, Premonitory Symptoms, &c., &c. | Parts Affected. | Nerve Affected. | Remarks. |
|---|---|---|---|---|---|---|
| 1 | George Morgan. The Ophthalmic Hospital. September 9th, 1861. | 63 | Florid; nearly bald. | Left forehead, upper eyelid, iris, side of nose to the tip. | Whole ophthalmic division of fifth nerve. | The eye inflamed and was practically lost. |
| 2 | Mrs. Kimpton. Metropolitan Free Hospital. December 17th, 1861. | 26 | Very pale and feeble. | Left frontal region, and mid-region of side of nose. | Frontal and both trochlear branches. | Eye not inflamed. |
| 3 | William Woolgar. March 29th, 1862. | 3½ | In usual health. | Right forehead, and mid-region of side of nose. | Frontal and both trochlear branches. | A portrait of this boy is published in the New Sydenham's Society's "Atlas of Skin Disease." Eye not inflamed. |
| 4 | Joseph Bond. July, 1859. L. 211. | 56 | Subject to bronchitis. | Left forehead. | Frontal division only. | He had also shingles of the right side of chest at the same time. Eye not inflamed. |
| 5 | A. B. A clerk. The Ophthalmic Hospital. | 25 | In good health; ten days' premonitory pain (severe). | Left forehead. | Frontal division only. | Eye not inflamed. |
| 6 | Mrs. Barnes. The Ophthalmic | 64 | Pale and thin, but in good health. Severe head- | Right forehead. | Frontal division only. | This was not a very severe case The eye was not affected at |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Hospital. June 9th, 1863. | | ache preceded the herpes, but was not confined to the forehead. | | | the date of my notes, but I have no record of subsequent progress. |
| 7 | John Thomas. The Ophthalmic Hospital. April, 1865. | 17 | A healthy sailor. | Forehead and side of nose. | Frontal, trochlear and oculo-nasal branches. | The notes are imperfect and do not state more than that there was much mucous discharge from the eye. |
| 8 | John Anderson. Ophthalmic Hospital. June, 1866. | 69 | A tailor, in good health. Had pain in the part, and also a slight rigor the day before the eruption came out. | Left forehead, and side of nose, iris, cornea, &c. | Frontal, trochlear and oculo-nasal branches. | The cornea was left with extensive opacities, and the iris was adherent at the pupillary edge. Throughout the whole attack the pupil could not be made to act with atropine. |
| 9 | Miss B., of Luton, Bedfordshire. | 68 | A spare but healthy lady. | Left forehead, side of nose, cornea, conjunctiva, and iris. | Frontal, trochlear and oculo-nasal branches. | This patient came to me a month after the attack, on account of the damage to the eye. |
| 10 | Mrs. M., Hertford. | 66 | A lady in rather feeble health, and with suspected renal disease. | Forehead, side of nose, cornea, conjunctiva, and iris. | Frontal, trochlear and oculo-nasal branches. | As in the preceding case this lady came after the attack on account of the state of her eye. The cornea was hazy, the pupil fixed, and the skin numb. |
| 11 | Mr. ——, of Hackney. | 60 | A very healthy man. | Forehead, side of nose, conjunctiva, and cornea. | Frontal, trochlear and oculo-nasal branches. | This gentleman was sent to me by Dr. King, of Hackney, on account of cataracts. |
| 12 | Dr. Markham's case. | 46? | Good health. | Left forehead and side | Frontal. The eye | This accomplished physician |

TABULAR STATEMENT OF EIGHTEEN CASES OF HERPES FRONTALIS—SEU OPHTHALMICUS (*continued*).

| No. | Name, Date, Reference. | Age. | Health, Premonitory Symptoms, &c., &c. | Part Effected. | Nerve Effected. | Remarks. |
|---|---|---|---|---|---|---|
| | | | | of scalp. | fortunately did not inflame. | was himself the patient. |
| 13 | A girl under Dr. Parker's care in the London Hospital. | 16 ? | | Left forehead, side of nose, and iris. | Frontal, trochlear and oculo-nasal branches. | Dr. Woodman was kind enough to show me this case. |
| 14 | Danielsen and Boeck's "Atlas of Skin Diseases." | 65 ? | Good health. | Right forehead and side of scalp. | Frontal. | No inflammation of the eye. |
| 15 | Rayer's case. A man. | 47 | | Left forehead. | Frontal division only. | Eye not mentioned. |
| 16 | Dr. Broadbent's patient. An officer. | 23 | Spare, but in good health. | Right forehead and side of nose, but not to the tip. | Frontal and both trochlear branches. | The eye inflamed, and the cornea was slightly opaque. |
| 17 | A girl. | 12 | | Forehead. | Frontal. | Eye not inflamed. |
| 18 | Mrs. ———. Ophth. Hosp. | 60 | Good health. | Right forehead, and side of nose. | Frontal, trochlear and oculo-nasal. | The side of the nose chiefly affected. Complete blindness resulted. |

The average age in the above eighteen cases was 47 years. Eleven were males, and seven females. The right side was affected in five cases, the left in nine. In all the tract supplied by the frontal nerve (forehead and front part of scalp) was affected; in eight the side of the nose, also in six of the latter the cornea and iris inflamed. In none of the cases in which the frontal nerve *only* was involved did the eye inflame, whilst it suffered in all in which the nasal branch was implicated (as shewn by eruption on the end of the nose). In two in which the trochlear branches were implicated, without the nasal, the eye did not inflame.

The clinical fact that the eruption may appear on the cutaneous territories of certain branches of the ophthalmic division of the fifth, whilst others are free, appears to me of the utmost importance. To appreciate its bearing we must recollect the anatomical distribution of this nerve. The ophthalmic division of the fifth, a purely sensory (and trophic ?) nerve after leaving the Gasserian ganglion, gives off a small twig to the tentorium, and then enters the orbit through the sphenoidal fissure. Just before entering this fissure, it has given off its nasal branch, and has then divided into frontal and lachrymal trunks. Between the Gasserian ganglion and its place of division it has received twigs from the cavernous plexus of the vaso-motor nerve, and very often a considerable branch of communication (to or from?) has passed between it and the fourth nerve. The destination of the frontal branch is to the skin of forehead, anterior two-thirds of scalp, the eyebrow, upper eyelid, and adjacent part of nose. Its two trunks which supply these parts have received the names of supra-orbital and supra-trochlear branches. Now the territory most frequently affected in ophthalmic shingles is that of the supra-orbital nerve, and next to it comes that of the supra-trochlear. The frontal is often affected without the supra-trochlear, but the latter never suffers alone. Both are often affected without the other branches, and when this

occurs the eye does not inflame. We have next to consider the lachrymal branch. This branch gives filaments to the lachrymal gland, to the conjunctiva, and lastly, to the skin of the upper eyelid. It is therefore not very easy to tell in any given case of ophthalmic shingles whether it is affected or not. It is difficult to tell whether or not the lachrymal gland is inflamed, and both the conjunctiva and the upper eyelid receive branches from other sources also. In any instance, however, in which the eruption is unusually free on the upper eyelid, and there is great swelling and much conjunctival congestion, we may safely believe that the lachrymal nerve is concerned. We have lastly by much the most important of the branches, as ophthalmic herpes is concerned. I allude of course to the nasal, or as it is better named, the *oculo-nasal*. This nerve, soon after leaving the main trunk, gives off the long root of the ciliary ganglion, from which the short ciliary nerves pass to the iris. It next gives off the long ciliary branches, which run directly to the ciliary muscle and iris, and subsequently it divides into two branches, which supply the middle and tip of the side of the nose with sensation, under the names of infra-trochlear and external. It follows then, that to know whether or not the nasal nerve is concerned in an attack of ophthalmic shingles, we must look for vesicles on the side of the nose, especially near to its tip. My cases are as yet too few in number to authorise a confident statement, but thus far I have never seen the whole side of the nose affected without also witnessing inflammation of the eye, and I have never seen the eye inflame unless the side of the nose showed vesicles. This fact (if it be one) seems to give us a step towards a knowledge of the trophic nerve of the eyeball.

It may, perhaps, be objected that the trophic disturbance resulting in iritis in connexion with herpes, begins in the lenticular ganglion, and passes from it to the oculo-nasal nerve instead of, as I infer, in the opposite direction. This, however, is most improbable, for whenever the oculo-

nasal nerve is affected in herpes, the other and larger divisions, frontal, &c., are also concerned, and these have no communication with the ciliary ganglion. If, further, the irritation began in the ganglion, instead of being taken to it by the branch from the oculo-nasal, then we ought to have cases in which the iritis is the earliest and most prominent symptom, which is not the case, the skin inflammation always appears first, and predominates in severity.

Although unwilling for the present to allow speculation to lead me further, I must beg to warn against hasty inference from the fact, that sometimes only one branch of the ophthalmic nerve, and sometimes all are affected, that it is therefore probable that the disease commences in the nerve trunks after sub-division, rather than in the cerebral or ganglionic centres common to them all. Such an inference is surely most unfounded. The nerve tubules which are to be distributed as the "frontal nerve," for instance, are just as distinct from those constituting the nasal branch when they are bound up in one bundle and called collectively the "ophthalmic nerve," as they are subsequently when divided. There can be little doubt that whatever may be their mutual relations for convenience of transit, that they are perfectly distinct from one another from beginning to end. It is therefore easily comprehensible that a source of irritation beginning either in the Gasserian ganglion, or in the meso-cephale itself, may be restricted in its influence to one branch only.

In almost all cases the tract of skin involved in the eruption remains for long partially anæsthetic. When the eye has been involved, the cornea frequently loses sensation, and never fully regains it.

## NOTES OF MISCELLANEOUS CASES.

By Jonathan Hutchinson, F.R.C.S.

Case I.—*Cataracts in Childhood fully developed in one eye.—Operation on one eye at the age of fifteen.—No sight obtained owing to atrophic changes in Optic Nerve.—Pupil of this eye very active.*

C. H., æt. 15, was under my care in 1863; a pale delicate lad. Teeth of good form, but crowded.

He came to me with divergent squint of the left eye, and a milky cataract, very white and opaque. The pupil was small, and acted most freely. I have never seen a pupil more active. He had also good perception of light, considering the cataract. The cataract had been noticed at two years old. He could move the eye in all directions when the other was covered. I had much hope from these symptoms that the fundus was healthy, and advised an operation. His other eye had an advancing cataract, but by shading it he could still see to read.

I operated on September 1st, at the London Hospital. On touching the capsule with the needle, all the fluid lens escaped into the aqueous. I at once used a broad needle and then a curette, and removed *all* the lens, leaving a beautifully clear pupil. No pain followed the operation.

A week after the operation, all being quite quiet, we tried his sight. He could only just see a hand, and could not make out fingers. With a lens he saw no better.

September 21. Ophthalmoscopic examination. Veins large and turgid; arteries small. The optic nerve was grey white; choroid thin; no pigment deposits. I advised him to wait as regards the operation on the other eye.

He is said to have been very delicate when an infant, and to have suffered from "water on the brain." Has since been a great reader. He is the youngest of five; all the others have excellent sight.

Case. II.—*Hypermetropia with Presbyopia.—Long continued employment of one eye for distance, and the other for reading with glasses of different strengths.*

A case which at first glance seemed puzzling, came under my notice a few months ago. A woman of 55 complained that she could not get glasses to suit her, "she had changed twelve times in the last 20 years." I ascertained that she was using + 9, and that with them she could read Snellen L. at 20′, and just make out words of Snellen 2, at 12″. Without her glasses she could see nothing at 20′, and only Snellen 12, at 5″. Thinking that she was hypermetropic and presbyopic, and needed stronger glasses for reading, I tried + 7, and found to my great surprise that she saw but little better in the distance, and could not read nearly so well as with her own. Finally + 8 seemed the best for distance, *but not so good as her own weaker ones* (+ 9) *for reading.* In this dilemma I tried her own glasses again, and now found that she had + 9 in one side, and + 6 in the other. Her eyes were exactly alike, and she had been accustomed to use one eye (left) with + 9 for distance, and the other (right) with + 6 for reading. The riddle was thus solved.

I. ultimately gave her + 5 for reading (and she could with these easily read brilliant at 12″), and + 8 for distance.

It is interesting to note that although this woman had for two years been using glasses of different powers, and employing one eye alone for distance, and the other alone for reading, yet she was not aware of it, and no damage appeared to have accrued to the eyes. She had experienced but little inconvenience, and had her glasses been respectively of their proper strengths, I think she would have been content to go on.

Case III.—*Extrusion of the Eyeball from the orbit caused by a thrust with a stick.—Paraphymotic Strangulation of the Globe entirely preventing replacement.—Excision of the Globe.*

The following curious case in which the replacement of an ejected eye was found to be impracticable, is the only instance of such injury which has ever come under my notice. The house surgeon had attempted reduction before I was sent for, and with equal want of success :—

Edward Tyler, a robust man, aged 20, came to the London Hospital about midnight, October 28th, 1864, with his left eye completely ejected from its socket. The eyeball was literally on his cheek, and was very tightly strangulated by the everted eyelids.

There was a small wound beneath the inner canthus close below the edge of the lower eyelid. The conjunctiva was entire. Whilst standing in a crowd, some one had stepped backwards, and thrust the end of a stick "into his eye." It was at once withdrawn, and its possessor immediately decamped. It fortunately happened that the injured eye had been almost blind for years. Finding all efforts at returning it to its place quite hopeless, I determined to remove it. This was done very cautiously, in order that we might ascertain the condition of the optic nerve without injuring it. After dividing the conjunctiva and muscles, the globe was drawn away, and it was found that the optic nerve had been torn completely across, three-quarters of an inch behind the globe. On exploring the orbit with the finger, its bony wall about the apex was felt to be extensively denuded of periosteum. The edges of the sphenoidal fissure could be easily felt. No fracture could be discovered, but from the nature of the injury we much feared that the thin and brittle bones of this part might have been splintered. In subsequent treatment the man was kept in bed, and ice applied to his scalp and eyelids. He did uninterruptedly well, and no indications of arachnitis were ever developed. He left the hospital at the end of three weeks.

The eyeball is now in Guy's Hospital Museum, forming one of the series of specimens sent in with my prize essay on Injuries to the Head.

### Case IV.—*Case illustrating the Stationary Character of some Cataracts.*

Mrs. Woolmar, æt. 59, came to me at Moorfields on February 5, 1866, on account of an acute ulcer of one cornea. She had, in addition, an over-ripe cataract in one eye, and a commencing one in the other, and upon these the interest of her case centres.

She brought with her a "hospital paper," dated April 13, 1848, with the diagnosis in Mr. Bowman's handwriting of "Cataracts in both eyes, with very opaque patches, the rest of the lens being quite clear," and a sketch of the appearance of the pupils after the use of atropine.

There was another note, April 5, 1849—"A little extension of the flocculent opacities: the rest of the lenses remaining perfectly clear."

In the left eye the opacity is still almost exactly as Mr. Bowman sketched it eighteen years ago. In the right the cataract is now complete, and has even spots of chalk in it; probably it was complete fourteen years ago, for she says that she was at that date under my care at the Metropolitan Free Hospital, and that I then advised an operation for its removal. As to how long the cataracts had been in progress before Mr. Bowman saw her, we have no evidence. She says that she never had very good sight, and that she had not noticed her sight getting much worse before she consulted Mr. Bowman, to whom she came chiefly because her friends told her that "white specks were forming."

Up to the present date she is still able, with her left eye, aided by a glass, to read and thread her needle.

Mr. Bowman's pen-and-ink sketch represents a well defined angular opacity in the upper and inner part of the lens, and a second mass lower down, both of them peripheral. The apex of the upper one reaches nearly to the centre. I asked Mr. Waren Tay to make a sketch of the present opacity (after use of atropine), and his delineation corresponded almost exactly with that by Mr. Bowman. The rest of the lens is still perfectly clear, as further proved by her present state of vision.

CASE V.—*Liability to Headaches.—Slowly progressive Amaurosis, with pallor of Optic Discs.—Death after a twelve hours' illness with Paralysis (Apoplexy).*

Mrs. W. Sorrel, æt. 51, became an out-patient at the Moorfields Ophthalmic Hospital in December, 1865. She then said that her sight had been failing for four or five months. The first symptom she had noticed was that she could not see to thread her needle. She had been liable for long to severe pains

in her head, not located in any one spot, but extending "all over." She had attributed them to the "rheumatics." They did not usually keep her awake at night.

As regards her previous history, she stated that she had been married for twenty-seven years, and had had eight children. The eldest of these died as soon as it was born, the second was living and healthy; all the others died early. One died last December of "consumption," æt. 12; this caused her great trouble, and to it she attributed her failure of sight.

The early deaths of so many children look suspicious of a syphilitic taint, but no history was obtainable. She also said that her husband was troubled with "scurvy," attended as an out-patient at the London Hospital for ulcers in his legs, and was liable at times to inflammation in his chest. Her mother died at the age of 75, and her father at the age of 57, and their eyes had never been affected in any way.

As above stated, her first symptom of defective sight was inability to thread her needle; for a time she saw double, but that passed off; later on she found she could not tell people in the street. "She always seemed in a fog." She had no alternating bright and dark days. She had no nausea, but occasionally was troubled with flashes of light.

At this date it is only noted as to the state of her eyes that her pupils were "rather large," that she could but just read the largest letters (No. 20 Jaeger) with the right eye; with the left she could not see the letters even. At the distance of twenty feet with the right eye she made out CC Snellen.

January 15.—It is noted that with the left eye she can find the window, but cannot count the "bars." With the right eye reads No. 20 Jaeger at from one to two feet. She also told the time by the clock (a guess?) but can still only make out CC of Snellen.

*Ophthalmoscopic Examination.*—Both optic discs are pale, and of a yellowish tinge. In the right eye, the part of the optic disc next the yellow spot is decidedly paler than the rest. In the left, the pallor is general. The artery (central) is perhaps a little less than normal, and the vein a little larger, but there are no other morbid changes.

February 12.—She has no headaches, and feels better.

February 19.—The urine has a sp. gr. of 10·15, is perfectly

clear and limpid, and on testing seems quite free from albumen and sugar.

February 26.—She again tells the time by the clock, but cannot get higher than Snellen CC.

Mrs. S. died on March 28, after 12 hours' illness. She had felt quite as well as usual during the previous day, and thought her sight improving. Suddenly she complained of pain in her head; said that "she could not open her eyes;" "my brain is turning, I shall go mad;" then threw herself back, and never spoke again. Her lower extremities appeared to be quite paralysed, and the upper extremities and face were much convulsed.

We were not informed of her death until some time afterwards, and the above particulars of symptoms which preceded it were given by her husband. No *post mortem* was obtained.

The case supplies us with another fact, although incomplete, towards our knowledge of prognosis in cases of cerebral amaurosis. It also illustrates the remark so often made that when amaurosis with white atrophy occurs in women there is almost always something either in the concurrent symptoms or in the sequel which marks the case as altogether different from those which are so common in the male sex (smokers).

CASE VI.—*A good example of used-up Eyes—Acquired Myopia—Ophthalmoscopic examination—Sclerotico-choroiditis posterior.*

The following case is the best instance of acquired myopia, aggravated into almost complete blindness, that I have ever met with. That the myopia was really acquired, I think is certain, for my patient was very intelligent, and assured me that through the first half of his life his vision, for distance, was good as that of any one he ever met with. It would perhaps not be possible for any one to subject his eyes more continuously to the causes of myopia than he had done. Although the case is only an extreme example of a large class, yet, as such, it seems to me worthy of narration.

Mr. M., æt. 68, a very intelligent man, has been all his life engaged as a reader for the press. In this vocation he would often read continuously at small print, and in the most careful

manner, from five in the morning till eleven at night. In early and middle life he had excellent sight, both for near and distant objects, and even under the labour he exacted from them, his eyes never felt fatigued. Twelve years ago (1852, æt. 56), he first noticed "a bee's wing" before the left eye, and found also that he was becoming short-sighted. He now began to use concaves whenever he went to church or theatre, but did not use them at his work. He found that he could not see more comfortably to read his proofs with glasses, and only used them occasionally to relieve the pressure on his chest induced by stooping forwards. He still went on with his work regularly.

In 1854 his eyes had got so much worse that he was obliged to diminish his hours of work. The eyes now began to ache much after working long; still he did not find any assistance from glasses. Numerous black spots were now seen before both eyes.

In 1858 the eyes began to fail much more rapidly. His eyes often ached, "as if they had been struck by a ball." In January, 1859, he could only see the largest objects. Since then he has not got materially worse. He is still able to get up the news by reading the street placards of newspaper contents, stooping and getting close to them. Even then he is obliged to miss such announcements as are given in less than the largest letters.

At 8″ he manages to spell out letters of No. XXX Jaeger.

Concaves have the effect of obliging him to keep at a greater distance from the object, and of much diminishing the clearness of his perception, *i.e.*, the objects are diminished in size, and his weak retina needs the very largest.

With the ophthalmoscope we found large irregular patches of the sclerotic near to the optic disc exposed (sclerotico-choroiditis posterior). In each eye the denudation approached, but did not actually involve the yellow spot. The optic discs were pale, and their arteries smaller than natural. There was not the least cupping. The media were clear, with the exception that in the peripheral part of each lens were a few small opaque striæ. The inverted image was easily visible without an object lens.

## SPONTANEOUS RUPTURE OF FILM OF CAPSULE THREE MONTHS AFTER EXTRACTION OF LENS.

By W. Newman, M.D. (of Stamford).

A woman, æt. 73, came to me July, 1865; I extracted by upper section the lens from the right eye; healing was tedious, iris implicated in wound, and ultimately a balloon-shaped pupil with well-marked film of capsule over it.

She could see outlines and masses, but said everything looked as if it was covered with mist.

The eye was nearly pale, and I had intended to tear up the film with two needles; when, at the end of October, she was one day using force to shut a window, when suddenly she became able to see well; at the present time, with glasses, she can see perfectly.'

I saw her some days after the accession of sight, the pupil was small, but clear from capsule.

## REMARKABLE VOLUNTARY POWER OVER THE MUSCLES OF THE EYEBALL, ACQUIRED BY TRAINING.

By Henry W. Williams, M.D. (of Boston, U.S.).

On the 21st February, 1865, I saw at the City Hospital, J. N., a man of about 45 years of age, whose right eye had been struck by a piece of iron five years previously, since when he had seen indistinctly.

On examination, the lens was found to be dislocated outwards and upwards, and suspended in such a way that it floated backwards and forwards with every considerable movement of the eyeball.

It had a slight, uniform opacity, which could be seen in a favourable light without oblique illumination.

Through the clear space towards the inner side of the pupil he could see distinctly with cataract glasses.

But the most interesting feature of his case was an extraordinary power over the muscles of the globe, by which he gave to the eyes almost inconceivably rapid oscillating movements, in every direction, at pleasure.

The motions resembled those of nystagmus, but infinitely increased in velocity, and could be made with equal readiness from side to side, upwards and downwards, or by causing the obliqui to act, in rotation. These movements might be styled flashing, so great was their rapidity.

Besides these more extended motions, he had the power of causing a slight quivering of the eyeballs, giving a very peculiar effect.

His statement was, that he discovered, at eight years of age, that he could give to the flame of a candle an apparent dancing motion before his eyes, and by practice he had increased his control of the muscles till it had attained its present degree.

## GLAUCOMA WITH UNUSUAL FEATURES OCCURRING IN A YOUNG AND HEALTHY MAN.

(Under the care of Mr. Critchett.)

The following are brief memoranda of a very unusual case of glaucoma which was under observation a few months ago. The patient was quite blind, and had very deep glaucomatous cups whilst his media, cornea, &c., still remained perfectly clear. His eyes, therefore, presented an unusually favourable opportunity for class demonstration of this subject, and were so employed. He had never had pain in the eyes themselves nor was there the slightest trace of congestion.

W. L., aged 25, a very healthy-looking man, was admitted as in-patient, in December, 1865. In December, 1864, he had first noticed a mist before his right eye. In two months he could see next to nothing with it. The left soon afterwards failed, and in six months he was blind.

He had had a little pain in the right side of his forehead before the right eye failed. He had flashes of light "like light-

ning," "they used to frighten him." He was also troubled with "muscæ."

He has been subject to toothache all his life, but was not specially so at the time his eyes failed. The pain in the right forehead continued, intermittingly, till within last two or three months. Pain in the left forehead came on when the left eye failed. He has flashes of light now before both eyes. He has had no pain in the eyeball itself from beginning to end.

He has never had any illness at all that he can recollect.

When he came to Mr. Critchett, both globes were very hard, but neither of them in the least congested. He could scarcely tell light from darkness. The media and cornea were perfectly clear, and in each eye with the ophthalmoscope a deep cup was seen. The veins were large and tortuous. The discs were very pale.

The stage being so far advanced no treatment was advised.

## NOTE ON AN EASY MODE OF DISTINGUISHING BETWEEN HYPERMETROPIA AND MYOPIA IN ORDINARY OPHTHALMOSCOPIC EXAMINATION.

By George Cowell.

In the ophthalmoscopic examination of an eye, which is sufficiently ametropic to give an image of the retinal vessels, without the interposition of an objective convex lens, it is often somewhat difficult to determine, particularly when the ametropia is slight, in which direction the abnormality lies; and this is particularly the case with those who use the ophthalmoscope but little. Of course the difficulty would not exist if all ophthalmoscopists had the power of completely relaxing their accommodation at will, but as this is an acquirement possessed by few, some simple method is necessary; and this must be my excuse for forwarding this note to the Ophthalmic Hospital Reports.

The ordinary plan adopted is for the observer to move his head slightly from side to side or upwards and downwards, according as the direction of the retinal vessel is perpendicular or horizontal, when the image will be seen to move with the head, if the image be erect (hypermetropia), or in a contrary direction if the image be inverted (myopia). But this plan is far from being free from error. By slight movements of the patient's eye, exactly opposite movements of the image will be produced, nullifying or exceeding those produced by the motion of the observer's head, and thus possibly rendering a series of observations contradictory. Mr. Hutchinson has a good plan of correcting this by means of the ordinary convex object lens. He found that by approximating it to the eye observed, the image increased in size if hypermetropia were present, but diminished if the opposite condition existed. In slight deviations, however, the appreciation of the change in size becomes somewhat nice.

The plan which has appeared to me to be most free from error is the following:—A finger of the hand not employed in holding the ophthalmoscope is held up as an object for the patient to fix with the eye under examination, and in such a position that the observer may get an image of one of the retinal vessels. If the finger be then slightly moved to and fro in a direction perpendicular to the vessel, the image will be seen to move with the finger when myopia is present, and in the opposite direction when the eye is hypermetropic. That this is so, explains the difficulty of forming a correct diagnosis when the method previously mentioned is adopted.

## CASES SELECTED FROM MR. DIXON'S OUT-PATIENTS.

Reported by Mr. Waren Tay.

Case I.—*Blindness, with White Atrophy of the Optic Nerves in connection with Idiotcy and Epilepsy—History of Nervous Disorders in many of the Patient's Relatives.*

Elizabeth Childs, æt. 16, came under the care of Mr. Dixon July 31st, 1865.

This patient was almost idiotic; she had not menstruated, and had been liable to "fits" from infancy; and there was a history of liability to "fits" on the mother's side of the family, though her mother had not suffered herself. Her grandmother, after the birth of her fourth child, became subject to them, and two out of five of her mother's living sisters are liable to them, and the three others "cannot keep themselves still." Two of her mother's brothers were liable to "fainting fits and bleeding at the nose."

This patient's sight had begun to fail about five years ago, (when the "fits" had recurred more frequently than usual), and had been gradually getting worse since, until she had now little more than perception of light.

With the ophthalmoscope "blue-white atrophy of the optic

disc" in each eye was detected. It was noted that the central vessels were of good size, and that the margins of the disc were clear and distinct, evidently an advanced stage of "white atrophy."

CASE II.—*Choroido-retinitis, resulting in Total Blindness.—No special cause discovered.*

Anne Baldwin, æt. 19, was admitted under the care of Mr. Dixon on March 17, 1864. She appeared to be in good health, and was moderately florid; her teeth were good; her aspect was not indicative of inherited syphilis, and no suspicious facts as to family history could be obtained. Her brothers and sisters (six) were reported to have very good sight. It was stated that up to eight years of age she was strong and healthy, but at that time she had the "whooping cough," and afterwards her sight gradually failed. At the age of eleven, owing to her defective sight, she fell into a well and hurt her spine.

For four years before she came under care she had been practically blind. There did not appear to have been any inflammation of the eyes, and she did not admit having had any pain in the eyeballs. She stated that she had suffered much from pain across the forehead habitually, but it was never sufficient to keep her awake at night. She never suffered from giddiness, nor swelling of her feet, nor weakness of her lower extremities. Her hearing and memory were both good.

There was slight divergence, with twitching of the globes. The pupils were of normal size, but very sluggish. The right eye was quite blind, and she could only just see light with the other.

*Ophthalmoscopic Appearances.*—The media were quite clear in both eyes. In the *left*, the optic disc was pale, and of a greyish tint (not white). The smaller vessels were visible over the whole of it. The larger vessels were much diminished in size, but quite visible, the vein being larger than the artery, but not of dark colour. The choroid was speckled over with irregular aggregations of pigment in very extensive patches, and there were numerous apoplexies into the choroid, especially near to the yellow spot. Some of them looked recent.

In the *right* eye, the retinal vessels were more numerous, but

still reduced in size. The disc was greyish, apparently of large size, its margins being indistinct (swollen, "woolly" optic disc). There were very large and numerous pigment patches in the choroid. The retina looked hazy.

CASE III.—*Case in which a foreign body has remained for three years in the vitreous body without causing serious Inflammation of the Eye.—Recent Symptoms of Sympathetic Irritation.*

Edward Cook, aged 38, was admitted under Mr. Dixon's care on May 3rd, 1866. He stated that about three years ago, while he was engaged in "millstone chipping," a piece of iron or stone struck his left eye, and that he had only been able to see large objects with it since. He attended at this hospital for about three weeks after the accident, and it was believed that no foreign body remained in the eye. The eye had been irritable at times ever since, but only during the last three months had he had attacks of severe pain in it. He believed that the lost eye was now affecting the other, as the latter was becoming so irritable that he could not read more than half a column of newspaper print at a time, and a mist would frequently come before it while at work. It was because he was afraid of his better eye failing that he now came for advice. On testing his vision we found that he could read brilliant very well anywhere between 6 and 13 inches from his right eye. With the injured eye he could read letters of No. 16 (Jaeger). Neither eye was in the least congested, nor was the tension increased in either.

In the injured eye the pupillary edge was adherent to the lens at the outer and lower part, and there was pigmentary deposit on the front of the lens capsule. With atropine the pupil dilated fairly upwards and inwards. A very conspicuous yellow-white body could be seen floating in the vitreous below the lower margin of the pupil. This was best seen with the unassisted eye. With the ophthalmoscope the vitreous was seen to contain many films, which so obscured it that the fundus could not be brought clearly into view.

November 5.—During the last six months this man has remained much as he was. There is no increase of symptoms of irritation. He keeps at his work, and is very unwilling to have anything done to the damaged eye.

Case IV.—*Primary Cancer of the Iris.—Slow Growth without causing Inflammation.—Excision of the Globe and Examination.*

The following case, as an example of Cancer of the Iris, is of special interest in connection with the almost parallel one recorded at page 189.

Alfred Wale, æt. 25, had been for some months under Mr. Dixon's care, on account of a growing tumour in connection with the lower part of the left iris. No inflammation of the eye ensued at any time; the tumour slowly grew, till it almost filled the anterior chamber, and prevented vision by covering the pupil. As the cornea remained perfectly clear the tumour, which was moulded behind it, was easily seen. It was a greyish, jelly-like mass, with opaque points scattered through it, and was abundantly supplied with minute blood-vessels. Until the pupil was covered the man retained perfect sight.

The date at which the growth commenced could not be determined with accuracy, but the man stated that so long as ten years ago there was something so remarkable in the appearance of the eye, that the late Mr. Ledger, our house surgeon at the time, showed the case to several of the surgeons. At this time the patient suffered no inconvenience, and was not willing to submit to any treatment.

At length the pupil having been covered and the eye rendered useless, Mr. Dixon advised excision of the globe. After removal the specimen was sent to Dr. Bader, the curator of the hospital, for examination. Dr. Bader reported that the growth consisted of a soft greyish brown mass, which adhered to the cornea, and had apparently grown from the iris and ciliary processes. The lens was still clear, but was pushed upwards and inwards. About half the iris was involved with the adjoining ciliary structures. The rest of the eye, even the cornea and sclerotic, to which the growth adhered, were quite free from disease, and showed no traces of inflammation. The mass consisted microscopically of delicate fibrous tissue with cells, some of the latter having several nuclei. Dr. Bader considered it an example of "medullary cancer with pigment."

The man recovered quickly after the operation, and is up to the present time quite well.

Part II.

# A Periscope

OF

# CONTEMPORARY OPHTHALMIC LITERATURE.

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## GYMNASTIC EXERCISE OF ACCOMMODATION IN CERTAIN FORMS OF ASTHENOPIA.

[*New York Medical Journal, October*, 1865, *p.* 15.—Abstract.]

Dr. Dyer, of Philadelphia, has an interesting paper on cases of asthenopia not complicated by hypermetropia, either latent or apparent. In most the accommodation is good, and in a majority there is some degree of myopia, sometimes very considerable. The patients do not complain so much of indistinct vision when reading, or of fatigue as of absolute pain in the eyes themselves. The pain lasts long, and is not relieved by a short rest; it is generally confined to the eyeballs. There is usually some intolerance of light, especially of gaslight. Its subjects are usually under thirty years of age, and often there has been special debilitating influence at work (masturbation, parturition, &c.). It is never complicated by convergent strabismus, but sometimes by divergence. These patients have usually been advised to rest their eyes. Dr. Dyer recommends on the contrary that they should be made to practice their eyes systematically, by reading for definite periods with glasses. Although unable to detect any insufficiency of the internal recti, he still suspects that there is usually "a discrepancy between the power of the ciliary muscle and the angle of convergence." His treatment is "to change the relation of the accommodation to the angle of convergence by glasses." "To the emmetrope I give convex No. 30 or 36. With a myope of one-tenth or less, I simply correct the myopia. In the higher grades of myopia it suffices to carry the far point out to 10″ or 15″." He allows of

practice with such glasses for only very short periods at first—three to fifteen minutes a-day, gradually increasing a minute a-day; very precise instructions are given, and no use of the eyes without glasses is permitted. The aim is by gymnastic exercise to increase the vigour of the ciliary muscle.

### INFLAMMATIONS OF THE EYE DURING CHOLERA.

[*Mr. McCarthy and Mr. Dove, in London Hospital Reports, vol.* iii. (*Cholera, Appendix.*)—EXTRACT.]

In a large proportion of cases, when collapse or reaction had been at all severe or prolonged, the following affection of the eye was observed. The vessels of the conjunctiva covering the sclerotic became congested, and the cornea dull. By no means the whole of the front of the eye was thus affected, only a patch elliptical in shape, the angles being directed towards the canthi. It usually included the lower third at least of the cornea. As the disease went on, there was a free secretion of muco-purulent matter from the conjunctival membrane, and the cornea became quite opaque, and in several cases ulcerated. The palpebral conjunctiva was but slightly affected, and in no case was there any considerable swelling of the lids. This affection seems to have been caused by the patients lying with their eyes open in sleep, or during the stupor so frequent in reaction. The lower lid appeared to be drawn by the shrinking of the tissues of the orbit, so that it required an effort to make the lids meet. Hence when volition was withdrawn, the eyes remained open, and the globe being turned upwards, the lower portion of the cornea came to be the part affected by exposure. Of course, the weakened condition of the patient increased the mischief, consequent on the want of protection.

The only treatment required was a weak alum lotion, and, in some severe cases, closure of the lids secured by the application of a pad of oiled cotton wool. In only one case of recovery, that of a female child, aged two years, did this complication prove at all serious. Here both corneæ sloughed rapidly, at a late period of the disease, and total blindness has resulted.

### ULCERATION OF THE CORNEA IN CHOLERA—CONDITION OF PUPILS, &c.

[*Mr. F. M. Mackenzie in London Hospital Reports, vol.* iii. (*Cholera, Appendix.*)—EXTRACT.]

Ulceration of the cornea is very rare. I have seen only three cases; it occurs in the very young only. It was noticed in an infant three months old, and from that age to three years.

At the very end of collapse, and commencement of reaction, the patient lies in a comatose state, with the eyelids semi-closed; a quantity of mucus secreted on the conjunctiva, or collected at the inner angle of the eye.

The eyelids may remain open for three or more days, without once covering the eye; the axis of the eyeball looks upward, leaving the lower third of the cornea exposed to the air, dust, etc.

Previous to the ulceration commencing, for three or four days, there is, apparently, a layer of opaque lymph covering the exposed surface, more or less. On attempting, in one case, to remove it with the corner of a sponge, I failed, and found it quite adherent, especially over the cornea. On the next day the part of the cornea covered was commencing to ulcerate. The film had separated, leaving a shallow ulcer.

The ulcer is generally crescentic in shape; the outer convex border being nearly at the margin of the lower edge of the cornea; the upper one, or concave edge, corresponding to the margin of the upper lid.

The ulcer may perforate, and follow the same course that ulceration of the cornea does in small-pox, etc. In one case the right eye only was affected.

The pupil, in cholera, varies a good deal; but it is certain that, in adults, during collapse, it is not widely dilated as in the cold stage of ague.

Atropine and calabar bean have the same effect on the pupils during collapse, that they would have in a normal condition.

The fundus has been examined with the ophthalmoscope, by Dr. H. Jackson and myself, but nothing very important was seen. The retinal veins appeared much distended, and were of a deeper colour than normal, and the artery did not look unnaturally small.

TITLES OF PAPERS PUBLISHED IN KLINISCHE MONATSBLATTER FUR AUGENHEILKUNDE, MAY AND JUNE, 1865.

*Contents :—*

Clinical Lectures by Prof. v. Graefe : reported by Dr. Engelhardt.
No. 1. On Amblyopia and Amaurosis.
Records of Cases.
10. Congenital complete irideremia of both eyes.
11, 12, 13. Three cases of disease of the optic nerve from intra-cranial causes.
14. Traumatic luxation of the crystalline lens, with formation of cataract.
15. Sudden amaurosis of the right eye, with slight exophthalmos and subconjunctival effusion of blood from a bayonet wound of the right zygoma.
16, 17. Two cases of traumatic rupture of the eye-ball.

The same, July, 1865.

*Contents :—*

Continuation of Prof. v. Graefe's Lecture.
The Electro-gymnastic Treatment of Pareses of the Ocular Muscles : by Prof. Szokalski.
Note on Retinitis Pigmentosa : by Dr. Höring, junr.

The same, August, 1865.

*Contents :—*

Continuation of Prof. von Graefe's Lecture.
On the Eye Diseases in patients suffering from Epidemic Cerebro-spinal Meningitis : by Dr. Schirmer (Greifswald).
Records of Cases.
18. Dropsy of the Sheath of the Optic Nerve.
19. Ischæmia Retinæ with Secondary Atrophy of the Optic Nerve.

September to December, 1865.

Reports of the Heidelberg Conference, with abstracts of the following papers :—

Prof. v. Graefe, on Modified Linear Extraction.
Pagenstecher, on Extraction of Cataractous Lenses, together with their Capsules.
Iwanoff, on the Pathological Anatomy of the Retina (perivasculitis retinæ).
Javal, on a new Instrument for Testing Astigmatism.
Knapp, on Obtaining a Greater Effect in the Strabismus Operation.
Dor, on an Improved Tonometer.
Giraud-Teulon, Anatomical Observations.
Leber, on the Lymphatics of the Cornea.
Testelin, on Traumatic Amaurosis without objective change.
Nagel, on the Localisation of Double-images.
Alfred Graefe, on Blennorrhœa in New-born Infants.
Knapp, on Certain Tumours.
Agnew, on a Method of Removing Secondary Cataracts and other Membraniform Obstructions from the Pupillary Region. (*See Abstract, p.* 239).
Prof. v. Graefe, on a more convenient Reading Glass, and a Binocular Refraction Metre.
Loureiro, on the Influence of Tobacco Smoking on the Diseases of the Eye.
Szokalski, on "Glioma Malignum Retinæ."
Delgado, on the Microscopical Examination of an Eye Blinded by Syphilitic Choroiditis.

The same, January and February, 1866.

*Contents :—*

Proposal for a Simpler and Better Series of Test Lenses: By Dr. W. Zehender. (*Abstract below.*)

On the Lymphatics of the Cornea: by Dr. Th. Leber.

Records of cases:

1. Embolia of a Single Branch of the Central Artery of the Retina. (*See abstract, p.* 237).
2. Embolia of the Ascending Branch of the Central Artery of the Retina..

3 and 4. Peculiar Form of Progressive Amaurosis. (*See abstract, p.* 240).

5. Pediculi Pubis on the Eye-lashes. (*See abstract, p.* 239.)
6. Remarkable instance of Recovery from an extensive Incised Wound of the Eye-ball. (*See abstract, p.* 247).
7. Supernumerary Lacrymal Canaliculus.

## PROPOSAL FOR A SIMPLER AND BETTER SERIES OF TEST LENSES.

[*Zehender's Klinische Monätsblätter, January and February*, 1866.—*By Dr. W. Zehender.*—ABSTRACT.]

DR. ZEHENDER, following the example of Burow and others, points out that the ordinary box of test lenses is not only costly, cumbrous, and inconvenient, but also that the lenses do not follow any definite rule of optical value. He proposes to substitute for the present test-case one containing only ten pairs of concave, and ten pairs of convex glasses, and measuring only about 8 inches by 6. He thinks such a series can be so planned as to supply every possible want.

The ordinary test-case supplied by Paetz and Flohr contains lenses of the following focal length in inches:—

2, 2¼, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 26, 28, 30, 33, 36, 40, 45, 50, 60, 80, 100.

The only correct principle in this series is that the focal lengths do not increase by single inches throughout, but by an increasing number of inches as the numbers ascend. Still the intervals are quite arbitrary and irregular. For example, the difference between No. 80 and No. 100 is equal to a lens of 400 inches focal length; while the difference between 11 and 12 is equal to a lens of 132 inches; and that between 4 and 4½ to a lens of 36 inches. These examples show that, in order to have a scale increasing by regular optical intervals, some of the higher numbers should be omitted, and that additional lenses should be introduced between some of the lower ones. It seems desirable to obtain a series, of which the optical strength should increase in arithmetical progression, so that the difference between the successive numbers should be the optical unit of the scale.

In determining the value of this optical unit various considerations of price and portability must be taken into account.

If its value were unnecessarily small, the number of lenses would be greatly increased; and, if its value were too high, the necessary accuracy of correction could not be obtained. After considering different values from these points of view, Dr. Zehender decides that a lens of 48 inches focal length will furnish the necessary mean. In a scale with a difference of $\frac{1}{48}$ between each successive pair of lenses, 25 pairs each of convex and concave glasses would afford all the varieties that could be required. These varieties, however, can all be obtained from a much smaller number, by combining two lenses together.

For this purpose Dr. Zehender uses plano-spherical lenses, both convex and concave, having their focal lengths in inches as follows:—

96, 48, 24, 16, 12, 8, 6, 4, 3, 2.

He designates these lenses by whole numbers, which express how often his optical unit ($\frac{1}{48}$) is contained in each of them; so that all the necessary additions and subtractions can be made with great facility. Thus, the focal length of 96 inches, equal to half the optical unit, is No. $\frac{1}{2}$. The focal length of 48 inches, the optical unit itself, is No. 1. The focal length of 24 inches, equal to two lenses of $\frac{1}{48}$, or two optical units, is No. 2. The others are numbered in the same way, as 3, 4, 6, 8, 12, 16, and 24, and are respectively equal to as many lenses of $\frac{1}{48}$ as those numbers express.

The case is arranged as follows:—

| Number. | $\frac{1}{2}$ | 1 | 2 | 3 | 4 | 6 | 8 | 12 | 16 | 24 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Convex. | | | | | | | | | | | |
| | | | | | | | | | | | |
| Concave. | | | | | | | | | | | |
| Focal length | 96 | 48 | 24 | 16 | 12 | 8 | 6 | 4 | 3 | 2 | |

Spectacle Frame.

It is manifest that all intermediate focal lengths can be obtained by simple combinations, and that the resulting lens will always be expressed by a fraction which has for its numerator the sum of the numbers of the lenses used, and 48 for its denominator. Thus, a combination of No. 8 with No. 1, both being concave or convex, would be equal to $\frac{9}{48}$, or a focal length of $5\frac{1}{3}''$. If one of the two lenses were concave and the other convex, as No. 8 concave and No. 1 convex, the sum of $-8+1=-7$; and $-\frac{7}{48}=6\frac{6}{7}''$ concave. Dr. Zehender furnishes a complete table of all the combinations—giving the focal length of each, and this table might be fastened into the lid of the box for reference.

For all ordinary purposes the unit $\frac{1}{48}$ affords sufficient accuracy. For cases in which a still finer determination is required, the addition of the lens of 96 inches (No. $\frac{1}{2}$) admits of extreme exactness. The combinations of two lenses will suffice for nearly all purposes; but the gaps that are still left may be supplied, if necessary, by using combinations of three.

The frame for these lenses differs from the ordinary one only in having a double groove instead of a single one; although Dr. Zehender has also employed a frame made by Paetz and Flohr, in which the second lens is held in a lateral clip, which can be turned aside at pleasure.

NOTE.—The addition to the case of two very thin discs of metal, the size of the lenses, and each perforated by a narrow slit, would render it sufficient for the examination of most cases of astigmatism.

### EMBOLIA OF ONE BRANCH OF THE CENTRAL ARTERY OF THE RETINA.

[*Klinische Monatsblätter für Augenheilkunde, January and February*, 1866.—ABSTRACT.]

Dr. Sämisch records the case of a man, 52 years of age, who came to him complaining of defective vision of the right eye, of such a kind that he could not see the lower part of any object that he looked at. The patient first discovered the defect two days previously, on waking in the morning; and a few days before that he had been using the right eye exclusively in shooting, so that its vision was then unimpaired. He connected his ailment with a gumboil that had formed about a right upper molar ten days before, and he had suffered no derangement of general health. Both eyes were emmetropic, and of normal acuteness of central vision, with presbyopia $=\frac{1}{24}$. In the right eye the lower half of the field of vision was almost entirely wanting. The defect was limited by a line passing upwards from the outer side, but nowhere reaching the horizontal diameter. Ophthalmoscopic examination of the inverted image showed the lower half

of the retina of a milky whitish colour, through which the choroid was but dimly visible. This turpidity of the retina was bounded by a line that followed a course upwards and inwards, touching the border of the optic disc, but keeping at some distance from the macula lutea. The disc and its vessels were normal, but the descending arterial branch was distended from the point where it passed off the disc. The distension affected a length of the vessel equal to about half the diameter of the nerve surface, and ended abruptly. From this point the branch was visible as a thin white cord, which contained blood only at one spot, and was seen with difficulty in the turbid retina, although the corresponding vein was very plainly visible and increased in volume. A complete examination of the general health of the patient gave only a negative result, and the circulatory system appeared to be entirely free from disturbance.

Notwithstanding the absence of any cause by which the formation of an embolus could be explained, Dr. Sämisch was of opinion that the case admitted of no other diagnosis. The ophthalmoscopic examination afforded absolute evidence of a limited affection of the vessel, and, except embolia, some disease of the arterial coat was the only possible cause of the condition. But no disease of the arterial coat would be likely to produce sudden vascular obstruction in a previously healthy eye, or to diminish the calibre of the vessel. Dr. Sämisch gave a guarded and unfavourable prognosis, on the ground that, even if the circulation were eventually restored, either collaterally or by removal of the obstruction, the complete arrest of the supply of arterial blood to the affected part of the retina would very speedily work irreparable changes in its condition. There was no indication for treatment, and the patient remained under observation. After ten days blood could again be seen in the peripheral parts of the occluded artery, and this blood gradually approached the centre. There was, however, no improvement in vision, and after two months the condition still remained unaltered.

Dr. Hirschmann records a very similar case to the foregoing, with the difference that the patient (an English nobleman, 55 years of age) had suffered during seven years from repeated attacks of articular rheumatism, and had a loud systolic murmur. The failure of vision had existed for six months when Dr. Hirschmann was consulted, and the condition was as follows. Manifest hypermetropia of both eyes, about $= \frac{1}{15}$ or $\frac{1}{24}$. Acuteness of vision, right about $\frac{1}{4}$, left more than $\frac{3}{4}$. With correcting lenses reads—right, Jaeger No. 5 ; left, No. 1. Left field of vision absolutely normal. Right, most of the lower half wanting. The defect is not bounded by a sharp line, but by an obscure belt, that is very narrow in the middle, and that increases in width on both sides, but most towards the inner. Measured at one foot

from the board, the field of vision extends five centimetres below the fixing point, somewhat lower on the inner, much lower on the outer side. In the defective part there is not a trace of perception of light. The loss of vision occurred suddenly, when the patient was stooping, and was attended by a sensation as of fire in the eye.

The ophthalmoscope showed that the ascending branch of the arteria centralis was obstructed on the nerve disc, and empty, or nearly so, beyond the point of obstruction. In one only of its twigs a very small thin column of blood was perceptible. No changes could be discovered in the optic disc or retina. As an experiment, Heurteloup's leech was applied three times, and produced an increase of central vision to $\frac{2}{3}$rds, and perhaps a better filling of the partially obstructed twig in which the then column of blood had been noted. There was not the slightest enlargement of the field of vision.

## PEDICULI PUBIS ON THE EYELASHES.

[*Klinische Monatsblätter für Augenheilkunde, January and February*, 1866.]

Dr. P. Steffen reports the case of a child three years old, who had three or four pediculi pubis on the lashes of each upper lid, with crusts of their eggs and excrement. There were no parasites on the head or the eyebrows, and there was no clue to the source whence those present were derived. The use of red precipitate ointment soon destroyed them. Dr. Steffen has been told by other practitioners that such cases occur, but he has published this one because he *cannot find another recorded in ophthalmic literature, and because the fact was to him entirely new.**

## ON A METHOD OF REMOVING SECONDARY CATARACTS OR OTHER MEMBRANIFORM OBSTRUCTIONS FROM THE PUPILLARY REGION.

[*Abstract in the Klinische Monatsblätter für Augenheilkunde, September to December*, 1866.—*By Dr. C. R. Agnew, of New York. Read at the Heidelberg Conference*, 1865.]

Dr. Agnew commences by describing his operation as follows:—

1. The patient should be in bed, lying on his back, completely narcotized by chloroform or ether, the eyelids held open by a spring speculum, and the pupil fully dilated by atropine. Let it be supposed that the right eye is the one concerned.

2. The surgeon, sitting behind the head of the patient, takes

* See "Ophthalmic Hospital Reports," vol. ii, p. 125.

a stop-needle in his left hand and introduces it through the cornea, on the nasal side, about a line from the sclera. With the point he penetrates the obstructing membrane near its centre, taking especial care not to injure the pupillary margin.

3. While the stop-needle, held immovably, fixes both the eye and the membrane, the operator makes a linear incision in the cornea on the temporal side, parallel with the margin and about half a line distant from it. A broad needle, a Beer's knife, or a lance knife, may be employed, and should be withdrawn with little or no loss of aqueous humour.

4. Through the linear incision a small sharp-pointed hook is carried into the anterior chamber, and its point is engaged in the same opening in the membrane as that of the stop-needle.

5. The membrane is now to be torn, and to be rolled round the hook, as far as possible, by a rotatory movement of the latter. When thus rolled, the hook and the membrane may be withdrawn from the eye together. When this cannot be accomplished, the membrane may still be torn widely open. After the hook is withdrawn, the stop-needle must be withdrawn also, and the operation is completed. A few drops of a solution of atropine (2 gr. to ʒj) should be applied.

The after treatment consists in the application of compresses moistened with cold water. The patient should be kept in bed, in a darkened chamber, for three days, and the eye carefully guarded for some time longer. The daily instillation of atropine is desirable.

Dr. Agnew believes that the use of the stop-needle, by fixing the membrane, prevents any hurtful traction upon the iris or ciliary body, and thus preserves them from danger of inflammation. He has also found the needle useful in performing iridectomy in cases of closed pupil from inflammation (the lens being absent); and in such cases he uses forceps instead of the hook. He related eight cases of secondary cataract in which he had operated with complete success, and without any evil consequences.

## TWO CASES OF A PECULIAR FORM OF PROGRESSIVE AMAUROSIS.

By Dr. L. Hirschmann.

[*Monatsblätter für Augenheilkunde, January and February*, 1866.]

The following cases are reported as examples of progressive amaurosis in which, when the central vision was already much impaired, the excentric vision remained almost intact; and the periphery of the field unbroken. In such a condition a single

examination of the patient would lead to a diagnosis of a stationary disorder of the optic nerve, and to a favourable prognosis as far as the increase of the malady is concerned.

Case 1.—Herr S., 64 years of age, married, of good health, and the father of nine living, healthy children, had lead a steady and regular life. On the 18th of July, 1864, he sought advice on account of recent impairment of vision. Examination discovered nothing abnormal, beyond hypermetropia of about $\frac{1}{20}$, considerable presbyopia, and some diminution of the acuity of vision. The patient read No. 2 of Jaeger. The impairment of sight was attributed to the presbyopia, for which a suitable convex lens was ordered. The actual diminution of acuity was thought to be due to some hypermetropic astigmatism, which, however, was not accurately tested.

In April, 1865, the patient was seen again. He complained of a cloud covering every object that he looked at; while the surrounding objects were still clearly visible. With the right eye he read Jaeger No. 17, with the left No. 15. The field of vision was nowhere curtailed, and the patient could count fingers at the periphery on all sides. Lateral illumination shewed slight turbidity of the lens; but not enough either to conceal the fundus, or to account for the imperfect sight. The fundus presented nothing abnormal unless that the papilla was possibly whiter than natural. Rest, absence of all excitement, and a light nutritious diet were prescribed.

By the 3rd of July vision was still more impaired, and only No. 20 of Jaeger could be read with either eye. Excentric vision had not suffered at all, or only very little. In no direction, either by daylight or feeble lamplight, could any contraction of the field be discovered. The lenticular cloud had not increased, the papilla was decidedly more white, with a tendency to blue. The retinal vessels were somewhat small. A seton was placed in the back of the neck, and sublimate given in pills.

By the 24th of July the patient read words of No. 20 with difficulty with the right eye; and with the left had difficulty in deciphering the letters singly. On testing the field of vision with lamplight and dull black paper, contraction was evident on all sides, but least in the upward direction. The field of the left eye was divisible into three concentric portions, not sharply defined, but yet clearly distinguishable. In the centre, the individual letters of No. 20 (Jaeger) could scarcely be deciphered at 8 or 10 inches by good daylight; and vision was therefore about $\frac{1}{40}$ or $\frac{1}{50}$. This centre was encircled by a zone in which the acuteness of vision was more than relatively, almost absolutely normal. Fingers could be counted in it at one foot. Beyond, in the outer zone, nothing could be seen by lamplight; but in good daylight movements of the hand through an extent of six

inches were barely perceptible. In the right eye the central vision was nearly as much impaired as in the left, but the peripheral vision was less affected. In both eyes the atrophy of the nerves was clearly visible. There were no pains in the head or spine, no impairment of any other sense, or of the mental faculties. The gait is somewhat feeble. Pills, containing nitrate of silver, were prescribed.

By the beginning of September the large letters at the heading of a newspaper could only be deciphered with difficulty at one inch and a-half. A light could not be seen at the fixing point, but became perceptible when moved away in any direction.

Case 2.—Adam B., 47 years old, labourer, applied on the 13th of April, 1865, complaining that all objects looked at were obscured by a cloud. This cloud appeared gradually, and constantly increases in thickness and in extent. The patient could read with the left eye letters of No. 20 at 8 inches. With the right he also read No. 20, but with much more difficulty, and only at 2 or 3 inches. He counted fingers with the right at 5 inches, with the left at 8 or 9. In the field of vision no peripheral contraction could be detected on either side; and excentric vision was almost normal at the extreme limits. The ophthalmoscope shewed nothing remarkable. The papillæ appeared somewhat pale, the vessels not particularly slender, the media perfectly transparent. The patient is in good health, but suffered a short time before from persistent headache, which has now ceased. Has used spirits and tobacco very moderately. A seton was put in his neck, and iodide of potassium given internally.

On the 16th of July the patient came again. He could then scarcely count fingers with the right eye at four inches, with the left at one inch. With the left he deciphers letters of No. 20 with difficulty at four inches. The field of vision not contracted on either side, either by day or lamplight; but the excentric vision considerably enfeebled. When the left eye is covered, the fixation with the right is no longer central. The ophthalmoscope shews that the papillæ are somewhat blueish, the arteries very thin, the veins somewhat thicker.

Dr. Hirschmann remarks that these cases were clearly examples of progressive amaurosis, and states that he perfectly remembers to have seen a third case of the same kind, of which he did not keep notes sufficient for an accurate report. He thinks that they throw much doubt upon the value of the absence of contraction of the field of vision as a basis for a favourable prognosis as far as regards the extension of the disease; and that, notwithstanding the absence of contraction, the prognosis should always be extremely guarded.

TITLES OF PAPERS PUBLISHED IN ARCHIV. FÜR OPHTHALMOLOGIE, VOL. XI, 1865.

*First Part.*

*Contents :—*

Researches on the Course and Relations of the Blood-vessels of the Human Eye : by Dr. Thos. Leber.

Contribution to the Records of Tumours (with an illustration) : by Dr. M. Landsberg.

On the Treatment of Muscular Asthenopia : by Dr. M. Landsberg.

On the Histology of the Eye : by Dr. Carl Ritter.

On the Acuteness of Vision in Astigmatics : by Dr. L. Kugel.

On Flap Extraction of Cataract and on the Use of Chloroform : by Prof. J. Jacobson.

Injury to the Eye by a foreign body penetrating near the Optic Nerve : by Prof. J. Jacobson.

Contributions to the Normal and Pathological Anatomy of the Eye : by Dr. A. Iwanoff.

On Sensibility to Colour : by Dr. Rudolf Schelske.

On the finest elements of Connecting Tissue in the Fibrous Layer and the Intra-granular Layer of the Human Retina : by Dr. Carl Ritter.

On Separation of the Choroid : by Dr. Iwanoff.

Contribution to the Treatment of Hard Cataract : by Dr. Gaston Braun.

On Persistent Pupillary Membrane and Polycoria : by Prof. Alfred Graefe.

*Second Part.*

On some Conditions of Binocular Vision in Strabismus, with reference to the identity of the retinæ : by Prof. Alfred Graefe.

On the Pathological Anatomy of Anterior Scleral Staphyloma : by Dr. Schiess Gemuseus.

On the Influence of Intra-ocular Pressure on the Circulation of the Eye : by Dr. Metrophan Mimocky.

On Ophthalmometry : by Dr. B. Rosow.

On Pus formation within the Conjunctival Sac : by Dr. Prosoroff.

Two Cases of Intra-ocular Cysticerci, with Dissections : by Prof. Jacobson.

On Flap Extraction of Cataract : by Prof. Jacobson.

Anatomical Contributions to Ocular Pathology : by Dr. E. Klebs.

On Ophthalmometry : by Em. Mandelstamm.

On the History of the Operation for Hard Cataract : by Dr. Joh Bapt. Ullersperger.

*Third Part.*

On Modified Linear Extraction : by Prof. v. Graefe.

On the Movements of Myopic Eyes : by Dr. Berthold.

On the Action of Various Medicines on the Palpebral Conjunctiva : by Dr. Prosoroff.

Disease of the Eyeball in Epidemic Cerebro-spinal Meningitis : by Dr. Jacobi.

On the Anatomy and Physiology of the Zonula Zinnii : by Dr. Hjalmar Heiberg.

On the Theory of Astigmatism : by Dr. H. Kaiser.

## ON OBTAINING AN INCREASED EFFECT BY THE STRABISMUS OPERATION.

[*Klinische Monatsblätter für Augenheilkunde. By Dr. Knapp. (Read at the Heidelberg Conference,* 1865.)—ABSTRACT.]

THE author points out the inconvenience of being compelled to operate more than once in cases of strabismus with considerable deviation. He speaks separately of two conditions:—1st. Considerable deviation without insufficiency of the antagonist; 2nd. Considerable deviation with insufficiency of the antagonist. In cases of extreme internal strabismus, it is seldom necessary to depart from the common practice, of a simple tenotomy of both eyes. Instances occur, however, especially in adults, notwithstanding good action of the externus, in which it may be necessary to operate even three times. In such instances the author practises a sufficient division of the rectus internus, and then passes a thread from the external margin of the cornea to the external commissure of the eyelids. He proceeds in the following manner:—The lids being held apart by the ordinary spring, a fine curved needle, carrying a thread of China silk, is passed through the conjunctiva, close to the margin of the cornea, from above downwards, for a distance of from one to two lines, accordingly as the conjunctiva is firm or lacerable. The needle is then carried through the conjunctiva and skin of the lids, from within outwards, just beyond the external commissure. The spring is removed, and the two ends of the thread are tied together, with sufficient traction to draw the eyeball outwards as much as may be desired. In this way is obtained the great advantage of keeping the squinting eye fixed in one position during the union of the tendon. The thread may remain one day, or sometimes two days; and the author has never seen suppuration or inflammation from its presence. Formerly he used plaster to fasten the thread instead of transfixing the eyelid, but the power thus obtained was insufficient.

In cases of extreme external strabismus, also without insufficiency of the antagonist, it is well known often to be necessary to operate three or four times. The author proceeds in like manner as with the first variety, but inserts his thread differently. It is furnished with a needle at each end. The necessary division of the external rectus being effected, one of the needles is made to enter the conjunctiva close to the inner margin of the cornea, and a line and a half above the horizontal meridian. The point is then made to emerge on the horizontal meridian. The second needle is entered a line and a half below the meridian.

and is brought out at the aperture made by the first, so that the middle of the thread lies upon the eyeball, external to the conjunctiva, and is not liable to tear out. The two needles are then carried through the eyelid at the inner commissure, very near together. They should enter just above the caruncle, and emerge on the skin two lines nearer the nose. By simply drawing the threads and tying them together, any degree of inversion may be obtained. The author prefers to have about a line and a half of adduction, since experience shows that this disappears; and that, if it be not obtained, a certain degree of divergence will ultimately be left uncorrected. The thread should be removed on the day after the operation; and, in this manner, an external squint of three lines may be cured by a single operation. The author formerly used only one thread, but found that this had a tendency to roll the eyeball upwards as well as inwards.

In cases where the antagonist muscle is paralysed, either from disease or from displacement in a former squint operation, Dr. Knapp uses his threads as auxiliaries to Mr. Critchett's operation for bringing forward the disabled muscle. In such cases he sometimes obtains his bearing from the ligatures used to bring the muscle forward, instead of from the ocular conjunctiva itself. In all cases he speaks very highly of the practical utility of his plan.*

### ON THE PATHOLOGICAL ANATOMY ON ANTERIOR STAPHYLOMA OF THE SCLEROTIC (SCLERECTASIA ANTERIOR, STAPHYLOMA CORPORIS CILIARIS).

[*The Archiv. für Ophthalmologie, Vol.* ix, *Part* II. *By Dr. Schiess-Gemuseus, of Basle.*

Four cases are related:—

Case 1.—A small partial staphyloma of the sclerotic through the ciliary body.

Case 2.—A total anterior staphyloma of the sclerotic through the ciliary body; destruction of the lens-system; wrinkled and pigmented retina.

Case 3.—Advanced anterior sclerectasia through the ciliary body, with general ectasia of the eyeball.

Case 4.—Total ectasia of the sclerotic; advanced atrophy of choroid and retina; deposit under the superficial epithelium of the cornea.

To this paper two lithographic plates, shewing the relation of the parts on a much enlarged scale, are appended. A third

* The use of sutures for similar purposes and almost exactly similar methods to those proposed by Dr. Knapp, has long been practised at Moorfields. More especially are they valuable after Critchett's operation, for bringing the internal rectus forwards.—Eds.

figure represents a magnified section of the retina from Case 2. These illustrations are well executed, but the lettering does not correspond quite so accurately with the description as the reader could wish.

### TWO CASES OF INTRAOCULAR CYSTICERCI WITH DISSECTIONS.

[*By Dr. J. Jacobson. Archiv. für Ophth., Vol.* xi, *Part* II.—ABSTRACT.]

THE subject of the first of these was a healthy woman, aged 20, who had never suffered from worms. She came under care on December 28, 1864, having suffered for a short time from pain in the brow and a fixed black spot before the right eye. Her sight, with the exception of this scotoma, was perfect, and the globe was not inflamed. Symptoms rapidly ensued, and on the 8th of February the eye was quite blind, and enucleation was performed. The patient had in the interval had much pain in the eye, and the iris, vitreous and other parts had participated in general inflammation. The ophthalmoscope had revealed the position of the parasite when the patient first applied, and whilst the vitreous was clear. It was then between the choroid and retina.

In the second case, the patient was a girl, aged 18, who was, when first she consulted Dr. Jacobson, already blind. Her first symptom had been, as in the previous one, a fixed, black spot. Some inflammation of the eyeball had occurred, and the globe was already of diminished tension. There was some hypopy on a fixed pupil, and the vitreous was too opaque to permit of inspection of the fundus. Enucleation was performed. A cysticercus was found beneath the retina. Dr. Jacobson states that he believes this to be the fourth example of a sub-retinal cysticercus causing the destruction of the eye which has been recorded. One of them will be found in this journal, third part, page 324, by Mr. Soelberg Wells (eye removed by Mr. Bowman).

Dr. Jacobson's cases are accompanied by some very interesting comments, and illustrated by several wood-cuts.

### ON THE TREATMENT OF HARD CATARACT.

[*By Dr. Gustav Braun, of Moscow. Archiv. f. O., Bd.* xi, 1, p. 200.—ABSTRACT.]

DR. BRAUN entertains the opinion that the recent modifications of cataract extraction, highly calculated as they are to allow of the exit of the lens with the smallest possible injury to the other structures of the eye, and fruitful as they have been in obviat-

ing certain dangers, such as sloughing of the flap and purulent irido-choroiditis, have rather served to divert attention from other dangers, and from the treatment necessary on their account. He relates that, at the commencement of his career as an operator, he performed extraction in the old way, then from six to eight weeks after a preliminary iridectomy, then after an iridectomy that made one step in the operation. By all these methods his results were extremely bad, insomuch that he lost 45 per cent. of the eyes operated upon. He then pursued the method of Dr. Jacobson, but with the same ill fortune; and this ill fortune was fully shared by his colleague, Dr. Rosander. Careful observation shewed him that the greater part of cataractous eyes brought to him presented all those indications that suggest an unfavourable prognosis. They were mostly deeply seated, with pupils sluggish and resisting atropine, with soft, inelastic, collapsing corneæ, with thin and fragile irides. These peculiarities were seen not only in old and feeble persons, but also in the middle-aged and strong-looking. He leaves the question how far these conditions were due to local and climatic influences; and goes on to say that his bad results were not due to any excess of cases of acute inflammation, but to chronic degenerative changes in the iris, sometimes with periodical passive hæmorrhages into the vitreous, leading to atrophy of the globe. Sloughing of the cornea, and purulent irido-choroiditis were not more common in his hands than in those of other operators. Considering the ordinary character of the morbid processes, he administered various medicines to his patients, such as valerian, castor, quinine, and ergot. From these little benefit was derived; and he then tried the effect of alcoholic stimulation, not waiting for the signs of mischief, but anticipating them. Every patient received about an ounce of brandy or sherry immediately after the operation, and repeated this dose twice daily for three days, the compressive bandage being applied. The result was greatly to improve his statistics; so that, after continuing this practice for a year, he had only 6 per cent. of eyes entirely lost, and 3 per cent. more with imperfect vision; these failures being all due to the ordinary forms of acute inflammation. The absolute numbers are not given. The paper winds up with some details of his manner of operating. He practices flap-extraction, with an iridectomy prior to the removal of the lens. He makes his flap in the limbus conjunctivæ; and thinks that chloroform is "unnecessary and injurious."

### REMARKABLE CASE OF RECOVERY FROM AN EXTENSIVE INCISED WOUND OF THE EYEBALL.

[*By Dr. Steffan. Klinische Monatsblätter f. A., January and February*, 1866.—Abstract.]

On the 2nd of May Dr. Steffan was called to a girl, nine years

old, who had injured her right eye a few hours before by a blow from a splinter of glass. By the time of his arrival, the free bleeding from the external wound had ceased, the eyelids were closed, and there was no pain. On carefully separating the lids he saw an incised wound, commencing on the cornea, about a line and a half from its inner margin, and just within the area of the pupil, and extending horizontally to the root of the nose. This wound had gone completely through the cornea, causing prolapse of the iris. It then divided the other coats of the eye, sclera, choroid, ciliary muscle, and retina for a length of about four lines; so that the eyeball must have been rolled outwards when the injury was received. Proceeding in the same direction, the wound passed on through the caruncle and lachrymal sac to the side of the nose, dividing all the soft parts down to the lachrymal and nasal bones. At every attempt to open the eyelids the wound gaped, and gave exit to vitreous humour; the eyeball of course had collapsed. The absence of any indication of a foreign substance within the eye induced Dr. Steffan to aim chiefly at the closure of the scleral wound, so as to prevent further loss of vitreous humour. For this purpose a compressive bandage was applied, and a bladder of ice over it, and complete quietude was enjoined. In a few days, without any kind of reaction, the wound in the sclera had healed so perfectly as to be almost invisible, the anterior chamber had refilled, and the eyeball was restored to its natural dimensions; so that nothing appeared but a simple corneal perforation, with prolapsus iridis. The prolapsus was snipped off, and a slight pupillary exudation was counteracted by the fullest possible dilatation with atropine. The only visible trace of the injury was an adherent leucoma, a line and a half in length, on the inner side of the cornea. When the healing was complete vision was perfectly natural. The wound of the lachrymal sac left a slight fistulous opening in the inner canthus, but this produced no inconvenience.

The case much resembles one recorded by von Graefe in the Arch. f. O., Bd. 1, 1 S. 406. In this, however, v. Graefe withdrew from the eye, through the scleral wound, a splinter of glass eight lines in length, and three lines broad at its broadest end. The patient (a boy) recovered perfect vision.

### THE TREATMENT OF MUSCULAR ASTHENOPIA.

[*By Dr. Landsberg, of Danzig. Arch. f. O. Bd.* xi, 1, p. 69.—Abstract.]

Dr. Landsberg describes several cases of severe muscular asthenopia (insufficiency of the internal recti) successfully treated by the application of the continuous galvanic current. In some of them, displacement of the external recti by tenotomy had been practised with little benefit, and the patients were disabled from

following any occupation that required ocular fixation. The paper gives minute details of twelve cases, all of which are said to have been cured. The mode of application was to place the negative (carbon) electrode of a Stöhrer's battery in the neighbourhood of the inner angle of the closed eyelids, and sometimes directly upon the conjunctiva, and the positive (zinc) electrode close to the root of the nose. The battery used was composed of from four to eight cells, and the duration of each application did not exceed thirty seconds. The applications were at first repeated daily, and at more distant intervals, as the beneficial effect became pronounced. Upon the *modus operandi* of the galvanism, whether by improving the nutrition of the muscles or otherwise, the author expresses no opinion.

Note.—Stöhrer's batteries (of Dresden) are imported by Pratt, 420, Oxford Street. For this purpose the continuous current only must be used (that furnished by cells alone, without an induction coil). The best electrodes for the muscles of the eye are fine metallic rods, the size of knitting needles, covered with the smallest possible coating of fine sponge at their tips.

### ADDITIONAL LACHRYMAL CANALICULUS.

[*Klinische Monatsblätter, January and February*, 1866.—Abstract.]

Dr. Steffan describes a supernumerary canaliculus in the right lower eyelid of a patient who consulted him about some other matter. The second punctum was a line below and to the outer side of the normal one. It could not be determined whether the second canaliculus entered the lachrymal sac by an independent opening, or indirectly through its fellow.

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and Journal of

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Part I.

## Original Contributions.

### A PHYSICIAN'S NOTES ON OPHTHALMOLOGY.—CASES OF DISEASE OF THE NERVOUS SYSTEM IN WHICH THERE WERE DEFECTS OF SMELL, SIGHT, AND HEARING.

(A continuation of a paper, p. 78, vol. v.)

By John Hughlings Jackson, M.D.,

*Assistant-Physician to The London Hospital and to the National Hospital for Epilepsy and Paralysis.*

It will, I fear, strike the reader, that in the consideration of Cases XIX. and XX., I speak too much of some symptoms which are out of the scope of a Journal of Ophthalmology. However, much of the interest of a case lies in the number of symptoms which can be put together in an intelligible order. Amaurosis may be studied at once with too much intensity and too little breadth. It is to the Ophthalmologist a Disease of so great importance, calling for particular action on his part, that he may underrate its significance as a Symptom in general conditions of the System. But it is when it occurs with other striking phe-

nomena that we are most likely to discover what optic neuritis means.*

In no department of Medical Science has so much progress been made as in Ophthalmology. An earnest desire that those in more general practice should share in working at the wide questions raised by the discoveries of Helmholtz, Donders, Graefe, and many others in this country, induces me to write in this Journal. In short my object in writing is to urge Physicians and Ophthalmic surgeons to do more work together.

If Amaurosis and Defect of Speech are found together, as in Case XII. and Case XXII., both the symptoms must be studied by one person. Again, I scarcely see how the Ophthalmologist can confine his thoughts to a single sense apparatus, however much his practice may be limited to the treatment of defects of that one. The Physician's wider field of work will not permit a consideration of one of them only. To him defect of Smell has a significance equal to that which defect of Sight has, although the former is of smaller importance. It is obvious that a consideration of the presence of defects of some of the special senses with disease of the hemisphere, and of the absence of striking defect of hearing,† is a very important one to ophthalmologists, physicians, and psychologists, however these differences may be explained. Optic neuritis is the sense disorder which most frequently occurs with one-sided (limb) symptoms. Defect of each of the special senses ought to be especially considered, positively and negatively, in relation to these one-sided symptoms.‡

* When I use the term amaurosis, without qualification, optic neuritis, or the atrophy following it, is meant.

† I have, Lond. Hosp. Reports, vol. i, related a case of hemiplegia from *Disease of the Pons Varolii*, in which case there was deafness on the side of the facial paralysis. When I use the word hemiplegia in this paper, however, I mean the common form of it. I have spoken of this symptom at great length in two lectures in the London Hospital Reports, vol. ii.

‡ More generally, we ought never to forget that the region of the brain of which the corpus striatum forms part, is the most vascular one of the

Hemiplegia, with its allies, therefore, is the extra-ophthalmological symptom which chiefly deserves the consideration of ophthalmologists. Let me now speak even more widely of ophthalmological studies than a view from my own stand-point of practice would permit.

Odd as it may at first sight seem, I feel more and more convinced that there are important reasons why ophthalmologists and those physicians practising in insanity should do much work in common. Not because defects of sight are particularly associated with mental symptoms, nor because insane people may be liable to defects of sight. It is because, I think the special study of the Evolution of Movement [and of Sensation] is best begun at Ophthalmic Hospitals. And so far as we can know anything definite of mind, it is, I suppose, made up of sensory and motor phenomena—the functions of a series of anatomical possibilities in the cerebrum in correspondence with its wide environment, as well as in the spinal cord with its narrow environment.

Any one who has studied the striking physico-psychical symptoms which sometimes occur with paralysis of the limbs of one side—most frequently of the right side—must have been struck by the association of defects of certain highly complex motions, *e.g.*, of articulation, with what are arbitrarily distinguished as mental defects. There is indeed to be traced, as I think, a series of defects continuous in the differentiations of motion, from difficulty of articula-

higher divisions of the nervous system, and the one most often damaged. This is true as a mere clinical observation, and the fact is significant in the study of the relations of vascularity to function, and its consideration is a highly important one in our attempts to fix the seats of certain "faculties." We should contrast optic neuritis, the sense disorder which occurs with one-sided loss of power over our limbs as voluntary organs, with the slow atrophy, &c., which occurs with double-sided symptoms, as disordered locomotion, *e.g.*, "Locomotor Ataxy." We shall thus, I think, learn something of value as to the relations of the special senses in health to voluntary and to involuntary motion, notwithstanding that the association of the *symptom* double amaurosis with one-sided *symptoms* may be an accidental association.

tion to incoherence. It is scarcely necessary to say that the essence of speech is not noise, but motion. Let us (See p. 306) instance a commoner set of motor phenomena.

The muscular irregularities in chorea are, clearly, psychico-physical disorders of motion. For they are a profusion of purposive movements, and not a mere set of spasms or cramps. The variations of muscular life in time are best studied in cases of chorea, epilepsy, &c.

To establish the laws of healthy muscular movements, and of those variations in them which occur in certain altered states of nerve tissue and nervous organs, is a thing of fundamental importance for the progress of the Medical Physiology of the Nervous System. I have no faith that this sort of physiology will make steady progress until the body medical is more highly organised. There is great differentiation in Medical Practice, but not enough unity of aim in cultivators of Medical Science. Now nowhere could we better begin to study *intelligent* movements of muscles than at Ophthalmic Hospitals.

The strange delusional effect produced by paralysis of the superior oblique muscle must have long struck psychologists. Nor does such a delusion lose its significance, however sharply we may define its cause to be merely a loss of a particular way of moving or of helping to move one of the eyeballs. The way a man moves and carries himself who has paralysis of this one ocular muscle, is an excellent illustration of the tendency there is in organisms to equilibration.

The study of the higher movements, as for words, will, I feel sure, derive great help from the Laws of muscular motion, which ophthalmologists have been or will be able to establish in their own department of medical practice. They observe phenomena in which motion and sensation are very distinct, and yet quite inseparable. Were the positive disorders of muscular movements studied in our particular cases of disease of the Nervous System, rather than cases of Strabismus, Chorea, Aphasia, Epi-

lepsy, Locomotor Ataxy, &c., we should, I think, make far more progress than we now do.

Were I free to work in this metropolis at the Physiology of Movement, from gross muscular movements towards thought, in the way I should prefer—supposing to begin with an ordinary general medical and scientific knowledge—I should study first in the wards and in the out-patient room of a General Hospital, such symptoms as Hemiplegia, Chorea, and Epilepsy; next, at an Ophthalmic Hospital Paralysis of the Cranial Nerves and defects of Sight. Next, at a special Hospital, for such symptoms as those of Locomotor Ataxy, and certain Epileptiform Seizures. Then at an Orthopœdic Hospital for Infantile Paralysis and for so-called Contractures. Now I would study specially deviations from healthy movement of the eyeballs, and the rudimentary delusional effects they cause. I would, after this work, return to the General Hospital, to study defects of Speech, Delirium, Apoplexy, Coma, &c. Varieties of defects of Speech I should compare and contrast from difficulty of articulation to incoherence. At this juncture a careful study of laryngeal and throat diseases would be most desirable.*

Of course if any one were to work at different sections of medical practice, so as merely to add isolated series of facts to one another, he would really make little progress in cultivating his own mind. Such a man would dwell

* The above is a mere sketch. It will be seen that I speak chiefly of phenomena, and for convenience in the illustration, solely of phenomena of motion. I think, indeed, it is far more important in the present state of our medical knowledge to study most what disorders of motion really do occur, and their relations to one another, than to work at certain problems as to the causes and meaning of any arbitrary sets of motor disorders. Oddly enough, many prefer working at or thinking on *causes*, to putting in order—any order—the phenomena occurring under their eyes. We shall not, I submit, arrive at a knowledge of the causes of disease until we have paid more precise attention to a wider range of outward phenomena. Of course the object of studying outward phenomena is to obtain a corresponding knowledge of internal states. (See postscript No. 2, p. 306.)

with exaggeration—hurtful to his own organization of medical knowledge—on amaurosis as a defect of sight, and too little on it as a defect of a highly specialized part of universal sensation. He would not improbably neglect altogether such symptoms as defects of smell, which defects, however, are really quite as significant incidents in the revelations which disease makes of function as defects of sight are. Such a student would be altogether unprepared for the last and the very highest medical study viz., of Insanity. Special work at diseases of the mind should, I feel convinced, be begun only after a large real experience of all the special phenomena of motion and sensation that damage to any parts of the Nervous System does or may give rise to. I say a real experience, as I suppose a collection of numberless facts, however accurately gathered, is not held to be of itself a real experience. Unless a man can put the particular phenomena he himself sees under more general Laws, or unless he tries to do this, he can scarcely be said to know or to be studying a thing in any very valuable sense. The knowledge the ophthalmologist has of muscular disorders of the eye; the knowledge the physician has of defects of articulation, of chorea, and of epilepsy, and that the psychologist has of incoherence and delusions should aim to be Physiological* Units, each different but each related to a wide common knowledge of such Laws—present or in progress—as those of the Evolution of Sensation and Movement in organisms.

The motorial disorders in several cases I have to relate will enable me to refer again to these points.

To return to my particular task. I am compelled to continue to treat amaurosis very widely, and, I fear, loosely. Indeed the four symptoms loss of sight and smell, defects of taste and of hearing, occur in one patient, as Case XXI. shows. If I find, as in Cases XII. and XXIII., loss of

* Physiological Unit is a term introduced by Herbert Spencer. To understand the wide meaning of this term, Mr. Spencer's work on Biology must be studied.

speech with amaurosis, I must consider the two symptoms together. Therefore in relating and commenting on the observations I bring forward, I shall not dwell more on defects of sight than on any other important symptoms the cases may present for the consideration of cultivators of Medical Science. I am obliged to dwell on symptoms further from amaurosis even than anosmia or loss of speech may seem to be,—on such symptoms, for instance, as epileptiform seizures,—because in my field of work certain convulsive attacks occur not unfrequently with amaurosis. I have no doubt the experience of ophthalmologists on this last point is very different. A physician sees those cases of amaurosis in which convulsions occur, because convulsion is a physician's symptom. And when severe convulsions come on in a patient attending at an Ophthalmic Hospital, he will probably leave for a General Hospital. I have referred to this,—the social aspect of our studies,—in some remarks, p. 65 (see also remarks following Case XXIII.). The following case further illustrates those remarks. I have already published most of the facts of the case in the Medical Times and Gazette, August 30, 1864, pp. 481-2.

See Case XX.

In every disease we have to seek (1) the Tissue affected; (2) the Organ damaged; and (3) the Function disordered. This very rudimentary division of our thoughts on single cases into, as it were, three interweaving lines of thought, constitutes, I conceive, a natural basis for the Classification* of cases of disease. Each case, to keep to

* On these points I have already remarked, partly with reference to hereditary transmission and partly with reference to classification of disease. See Brit. Med. Jour., Nov. 24, 1866. Also London Hospital Reports, vol. i. "Lecture on the Study of Diseases of the Nervous System." The distinctions I make betwixt the life, structure, and function of a part will seem to be artificial. "Disorder of function" is almost a contradictory expression. It will, however, be found, I think, that Units of Function do not coincide with Units of Nutrition (see note on arterial regions), and it is convenient to use

the Nervous System, should not be described from disorder of Function only, as "Locomotor Ataxy" nor from damage to the Organ only, as "Disease of the Cerebellum," nor from Tissue changes alone, as "Syphilitic Disease of the Pia-mater," but, when possible, from all three. And when we can get to know only the disorder of function, the gap in such a classification keeps us in mind where speculations and work—not explanations—are wanted. In Case XX we may, I think, venture to speak on each of the three points, and I shall do so at some length, as, besides the question this individual case particularly raises, *i.e.*, the real nature of so-called Syphilitic Diseases of the Nervous System, it leads us to a more general consideration of the secondary changes with which various sorts of disease in the hemisphere are sometimes associated.

There can be little doubt that there is disease near the right (2) corpus striatum, as in Cases XII, XIII, XVI, XVIII, and XIX. It is most probably disease in the (1) connective tissue of the pia-mater, as in Case XIII. (See further on diffused changes.) The (3) functions disordered are the epileptiform seizures and the blindness.

To speak, first, of the tissue changes. There are two chief ways in which syphilis brings about hemiplegia, and, as I think, unilateral epileptiform seizures also. The patient whose case is now the text had both these symptoms.

(*a*) By sudden obstruction of cerebral arteries already diseased.*

(*b*) Hemiplegia—as I believe happened in Case XX—comes on as a consequence of changes associated with coarse and obvious syphilitic disease of the surface of one hemisphere, which coarse disease may or may not actually

the term *disorder of function* in contrast to that of *harmony of functions*. I intend shortly to consider the whole of these points from the basis of *Classification of Diseases of the Nervous System*."

* I have (Lancet, Oct. 27, 1866) spoken of syphilitic disease of the cerebral arteries. I have there referred to Wilks' and Bristowe's previous researches.

invade the motor tract itself. Under these last circumstances the hemiplegia is nearly always associated with convulsion.

I think it most likely that there is coarse disease in the case I have just related, as there was in Case XIII, rather than mere softening from plugging of the right middle cerebral artery. I think so because the sort of amaurosis the patient had is generally the result of* coarse disease within the head. And, of course, we must judge also by the general symptoms, of which amaurosis is only one, when we can get to know them. I do not judge by the particular kind of convulsive attack, as I believe seizures of this sort occur after softening from plugging of branches of the middle cerebral artery. Indeed, when we get enough knowledge, I hope we shall find that conditions of the optic disc—phenomena which can be more precisely estimated than pain in the head and vomiting—will help us to determine something as to whether the internal changes associated with these convulsive seizures are coarsely organic or not. At present to urge that optic neuritis, with epileptiform seizures, points to coarse disease within the cranium as the cause (indirect) of the seizures, would be to appear to be arguing in a circle. At present I can only say that *most probably* there is coarse local disease in this case, as in Case XIII. (See p. 26.)

I will now digress to allude to the treatment of syphilitic nervous affections, for this will almost at once lead me back to a more precise consideration of the nature of the Tissue changes which give rise to or permit the particular symptoms my patient has had.

* However, since the last paper (p. 78) was printed, I have seen an autopsy made by Dr. Moxon, on the body of a man who had previously been under my care—before that under Mr. Hutchinson's care—for optic neuritis, and in this case no such *coarse* intracranial disease was discovered. (See Ophthalmic Review, April, 1866.) Then there is the source of fallacy that coarse disease of the nervous system is more likely to prove fatal, and thus my observations of cases, *post-mortem* and *ante-mortem*, may not be fit for comparison. I, however, judge by other symptoms, as by vomiting, &c., and by examinations of the eyes in many cases of chorea.

Although I have much faith in the power of iodides and mercurials to reverse the recent changes which syphilis induces in the Tissues, I have not very much hope of cure when treating cases of convulsions, hemiplegia, and amaurosis, the results of syphilitic disease of Nervous Organs. This is an important distinction.

In the first place, it would be as hopeful a task to try to procure the absorption of tubercle as to get some of these syphilitic "deposits" taken up by the drugs I have named. An ophthalmic surgeon would not give drugs in the hope that lymph effused on the iris six months before would disappear. He could only hope for success when he could interpose whilst uproarious changes were actively going on. Similarly the physician can only hope to get rid of lymph effused in the pia-mater when recently effused —as when a patient consults him for severe pain in a limited part on one side of the head; not when, some time later, he comes for a "fit," due to diffused changes in his brain. But if we really could get rid of these "deposits" altogether we should, to cure the patient of his epileptiform seizures, &c., have to reverse also the changes of nutrition of nerve tissue which the deposits had "excited"; for it is probably—I suppose this is the general belief—on secondary changes that the amaurosis and the epileptiform seizures depend.

No doubt the various conditions of the nerve tissue damaged in the hemisphere which permit the fits are analogous to various conditions seen by aid of the ophthalmoscope, at the ends of the optic nerves at the backs of the eyes. This positive sort of knowledge renders us less confident in our efforts at treatment, for when we have the optic discs under our eyes, showing acute changes, we feel keenly how little we are likely to be able to do. This, however, is the stage where treatment may, we trust, some time be useful. And the corresponding stage—I speculate—of the disease of the hemisphere which gives rise to or permits the unilateral seizures is the stage in

which we ought to interfere. Unfortunately, optic neuritis being frequently overlooked, we too often see only the permanent stage of optic neuritis, the stage of atrophy. And more often still we have to treat the permanent atrophy (?) of the nerve fibres of parts of the hemisphere which permits epileptiform seizures. It requires time for any sort of local damage to the cerebral hemisphere to bring about either the changes permitting epileptiform seizures or the changes which cause amaurosis, or, as in Case XX. &c., both.

In recapitulation, although this patient's (Case XX) "blindness and fits" probably depend as a *matter of fact* on syphilitic disease of the brain, as a *matter of idea* they depend on *coarse disease* of the brain. However convenient it may be to speak of cases like this, or say Case XIII., as "Syphilitic Diseases of the Nervous System," yet if we dispose of such individual medical problems by merely naming them thus, we shall not, I fear, think of our cases precisely, and treatment according to name will not prolong the satisfaction a superficial nosology first gives. These two *symptoms* are not syphilitic in any true sense. They will come on as the result of damage to the hemisphere of many sorts. Injury (see Case XVIII, p. 74) gives rise to just the same symptoms. I do not say it is not convenient to speak of a certain clinical group of cases as "Syphilitic affections of the Nervous System." Nor do I deny that syphilis may directly affect nervous tissue. However, I know nothing of the harm syphilis may do to the Nervous System, except as it acts by producing disease of the connective tissue in or about nervous organs and their blood-vessels. (See Note on Substitution Nutrition.)

Let us look at the subject from another point of view. There (Case XX) is a case in which there is or was hemiplegia from disease of the brain, and there is amaurosis too; or if the reader prefers not to speculate on the case of a patient who is still living, let us take Case XIII. Now,

before Helmholtz, we should have thought the amaurosis was, so to speak, syphilitic, and probably still those who never use the ophthalmoscope, would put down the defect of sight to syphilitic disease of the choroid. Similarly, now that it is known that defects of sight are sometimes due to retinal changes associated with those general changes which occur with chronic Bright's disease—when a patient in whom the general changes are marked is hemiplegic and blind—it is sometimes taken for granted that he has a clot in his brain, and a particular degeneration of retinal tissue, and perhaps clots in the eyes as well. This kind of reasoning is unsafe. It is true (see a case I have published, Lond. Hosp. Reps., vol. i, p. 384) that hemiplegia and blindness, each being the result of disease of a similar tissue—the choroid of the brain and the pia-mater of the eye—are sometimes found together. Again, I have (Lond. Hosp. Reps., vol. iii) published the case of a man who was hemiplegic from clot in the right optic thalamus, and blind from those retinal changes which sometimes occur with granular kidney. But, as a matter of fact,—now that we can see, if we will look, what kind of amaurosis really does occur with hemiplegia,—we find that the two events, the blindness and the paralysis, most frequently occur together,—not because similar or allied tissue changes have led to distinct damage of two organs, but because there is local coarse disease of the brain, from which coarse disease other changes diffuse. And the fact that that local disease is syphilitic (Case XIII.), tumour (Case II.), or blood clot (Case XI.), is not the point of most importance as regards the production of optic neuritis. The idea is the same, or similar, in each case; in each there is a "foreign body" in the brain.

So then the Tissue changes to which I first referred—disease of connective Tissue—are not *the* Tissue changes on which the epileptiform fits or amaurosis directly depend. The two sets of changes may be distinguished as Local

and Diffused.* Much of the hemisphere may be damaged without obvious symptoms of any kind, and it is doubtless only when the changes diffused around the damaged part reach the motor tract, or the convolutions near it, that the patient is liable to suffer from convulsions. In what direction the changes producing the accompanying amaurosis extend it is not easy even to speculate; but we must speculate before we begin our minute observations. And what the nature of these secondary changes may be is not yet properly known. Theoretically, I should imagine that lowered nutrition from any cause not leading to decided breaking up of the structure of the motor tract, would induce or permit convulsions of those muscular regions connected with it. If, however, the structure of the motor tract were actually damaged, there would be, if the damage were otherwise enough to produce any symptoms at all, one would think, not *disorder* of function—spasm, —but loss of function--paralysis.†

* These two expressions are clumsy. I do not like to use the terms Primary and Secondary, as I have used these expressions in a different sense. I have called changes in nervous tissue, beginning in nerve tissue itself, Primarily nervous, and those consecutive to disease of connective tissue, arteries, &c., Secondarily nervous.—Brit. Med. Jour., Nov. 24, 1866.

† I purposely avoid the use of the word softening in speaking of the changes about brain tumours. I may here say that I have no doubt that the whole of clinical evidence points to this conclusion which I draw from Dr. Radcliffe's researches, viz., that disordered function,—spasm, pain, incoherence, subjective sensations, &c.,—occur with enfeeblement, primary or secondary, of nerve tissue. The manner of production or of permission of convulsions from local disease of the hemisphere is a subject of extreme interest. And it is from those cases in which we can during life see something of the changes in part of a nervous organ, if it be only the end of a diseased nerve bundle, and not from cases of "genuine" epilepsy, that we shall, I think, begin to learn something of the nature of the permanent internal changes convulsions depend on. The contrast of *permanent* blindness and *occasional* fits is not the essential contrast. There are reasons to think that optic neuritis is the strict analogue of the *changes* producing or permitting unilateral epileptiform seizures. It may be, that the enfeebled hemisphere, or scattered parts of it, acquires a certain amount of tension from the nutritive changes of which it is capable, and that the tension is discharged through the *healthy* corpus striatum. Such speculations have, I think, this value, that they may

I now speak more in detail of the convulsive seizures. Amaurosis and these convulsive seizures must be studied together, if for no other reason than that they occur in connection with gross damage of the same part of the brain (see cases in last paper). I think it is certain that such convulsive seizures are the results of disease of some part of the hemisphere only, but the amaurosis, as I have several times urged, occurs with disease very variously seated; generally with obvious disease, as seen after death, in Case XVI, or as seen during life, Case XVIII. Although, in this paper, I speak of cases of convulsive seizures in which there is probably *obvious* disease of the hemisphere, I think it most likely that slighter changes, such as those resulting from embolism of the branches of the middle cerebral artery, will give rise to, or may permit, the same sort of convulsive attacks. Nay, in most cases of unilateral convulsions I should not expect to *discover* anything wrong in the Nervous System, although I should feel confident there was something abnormal in one cerebral hemisphere. In most cases of chronic unilateral convulsions there are no changes to be seen in the eyes. In a few there is irregularity of the retinal veins, and—to use terms—rudimentary neuritis.

Work at one of the symptoms will, however, help the work at the other; and I feel pretty confident that he who finds some of the steps of the process by which the changes of optic neuritis result from a foreign body in the cerebral hemisphere, will have learned much which will help research on the Laws of the slight, and yet widespread, Tissue changes, producing many obscure cerebral symptoms such as spasm, delirium, incoherence, &c. (See last footnote.)

The things most wanted are microscopical examinations

guide our microscopical inquiries to the exact position and nature of changes which occur in connection with disease of the hemisphere when unilateral epileptiform seizures and amaurosis, or unilateral paralysis and amaurosis, have been the symptoms during life.

to show on what structural changes of tissues diffused from "foreign bodies" the amaurosis and epileptiform seizures* depend. I hope Lockhart Clarke will tell us something of these changes in the parts I sent him from Case XXV.

To get to know in what region it is hopeful to look for the changes, we must do much clinical work before we begin our minute researches after death. In the specimen sent to Clarke the disease was so close to the optic thalamus that the Optic Nervous System may have been directly involved. The kind of cases which will help us to this knowledge are, I submit, those now considered in which there are symptoms of muscular disturbance of one side of the body, as unilateral palsy, or unilateral spasm, for these symptoms point, I feel sure, to a particular cerebral region, although to rather a wide one.

In the cases in which amaurosis occurs with epileptiform seizures (see especially Case XVI.), there is, as I have said, usually *coarse disease* of the hemisphere, and, in beginning to work at "epilepsy," I should begin—not with cases in which there is likely to be nothing discovered at post-mortem examinations—but at cases in which there is obviously something grossly wrong with the nervous

* I think it just as likely when symptoms like spasm of one hand or of one side of the body, or coloured vision, or a disagreeable smell come on, that the parts of the nervous system, on disordered function of which these phenomena depend, fail in some periodical change of the whole organism. An epileptic fit shews, I imagine, imperfect equilibration of a part with the whole. An emotional condition—perhaps we may say an arterial wave, *i. e.*, an affection of the whole heart of the body—sometimes gives rise, as we all know, to spasms of partially paralysed muscles. I do not neglect to consider, however, that enfeebled parts of the nervous system may fail because their own time, *i. e.*, the relation of nutrition to the possibilities of function, is not in harmony with the time of the whole organism. They have ceased to be physiological units. In Ague the periodicity, however much it may be manifested through the Nervous System, must, one would think, depend on alteration of nutritive changes, general or central. These questions are important ones for the consideration of ophthalmic surgeons as well as physicians.

system, as in Cases XVI. and XVIII. For the question is not what "causes epilepsy," but what conditions of altered nutrition and structure of nervous organs and tissues give rise to, or permit, disorder of function of any sort, viz., spasm of muscles, coloured vision, delirium, &c. From this point of view I earnestly beg that ophthalmologists will give epileptiform seizures a large share of their attention. And I ought here to remark more particularly that I do not say simply that Amaurosis in Case XX. occurs with Epilepsy. Not that this, according to a common use of terms, would be a wrong phrase, but because the term epilepsy has not a sufficiently precise meaning. Besides, this expression has not vitality in itself. It is extremely important to describe the sort of fit an amaurotic patient may have; and to call it "Epilepsy" gives the symptom too elastic a meaning, and careless people might think they had disposed of this part of a case by saying "the amaurosis is complicated with epilepsy." This classification would, I think, be an approach, under the cover of a conventional and yet an unreal preciseness to the analogous looseness, of saying "the amaurosis is complicated with paralysis," leaving it doubtful what sort of palsy there was. We want positive information as to how a convulsion is a *departure* from health of muscles and muscular groups and health of nervous organs and tissues, and not as to how far it *approaches* our idea of the almost metaphysical conception "genuine" Epilepsy. Whilst there are plenty of unsatisfactory "explanations" which cloud over our entire ignorance of the real seat and positive nature of tissue changes in the nervous system in most chronic convulsions, there are to be found on record scarcely any positive statements of what has really happened in particular convulsive paroxysms—a process which sometimes occurs under our very eyes. I am fully aware that there are admirable accounts of the worst fits as types, but some of these accounts are descriptions more of dramas of great

human interest than calm and cold scientific observations in an orderly sequence of the outward phenomena of an inwardly suffering nervous system. A tumour in the brain, at all events, is not likely to produce very exactly any form of "Epilepsy" described by the best authorities; and tumours, and other coarse forms of disease, are the usual intracranial changes which are associated with amaurosis.

Now, it is true that we rarely have the chance of getting a full and accurate account of the sort of fits our patients, amaurotic or not, have, but we can cautiously record what they and their friends tell us. It is especially important to get to know from them how the fit begins. But in a few cases there is no warning of the seizure, and no evidence to shew what physiological events really happen in any part of the paroxysm. Here we must be content to be ignorant and seek for better modes of investigation. It may then be allowable to say of a case that the amaurosis occurs with epilepsy, provided such an expression, whilst it implies that amaurosis occurs with general convulsions coming on periodically, implies also that a proper account of the paroxysm was not to be obtained.

Now, I have already suggested that unilateral convulsive seizures point to disease of the opposite side of the brain as unilateral paralysis nearly always does. I may say also that I feel convinced that unilateral chorea does too.* I do not mean that there is always disease which

* I have (Brit. Med. Journal, Sept. 22, 1866; Med. Times and Gazette, Dec. 1, pp. 584 and 585), suggested that unilateral chorea, unilateral convulsive seizures, and unilateral paralysis should be studied together, for facts towards ascertaining a knowledge of what I may here call the Laws of Muscular Life, and also for a knowledge of variations of muscular life in Time—both Time in the sense of the age of the patient, and in the sense of the time of the organism itself, or of the part injured. These three "diseases" are, I submit, due to variations of but one healthy state of the nervous matter of parts in the region of the middle cerebral artery. I may add that I distinguish those cases as unilateral in which the fits began in some muscles of the limbs on one side, or affect those on one side very much more than the

we can see without the microscope in cases of unilateral spasm, and everybody knows that there very rarely indeed is any, if ever, with unilateral irregular movements. Nor, it may be well to repeat, is unilateral paralysis or unilateral spasm often associated with amaurosis when the experience of ophthalmic surgeons and that of general physicians are put together. And the association, when it does happen, does not at present *seem* to be more than an accidental one.

Now, whilst every one grants that hemiplegia commonly points to disease of the higher parts of the motor and sensory tract,—the corpus striatum, and the optic thalamus,—I dare say few will admit that unilateral spasm usually points to disease in the very same region. No one is asked to accept any of these speculations, but this need not prevent the distinct study of cases in which defects of sight happen to occur with disordered states of muscles, be they what they may.—Constant Paralysis, Occasional Convulsions, or Continuous Irregular Movements, of a *certain Physiological Region, e.g.*, the muscles of the limbs. Such a kind of work will be more hopeful than working at cases of amaurosis as they are "complicated" by the entities "Epilepsy," "Paralysis," or "Chorea." There are,

other. In some attacks of this sort, the other side of the body may be convulsed after the convulsion in the one first affected is over. Unless a patient's friends are unusually intelligent, we get no information worth much as to the real nature of the full paroxysm. Then, I mean unilaterally as regards the limbs, but the trunk is also affected (see next footnote) in the complete paroxysm.

Until physicians work at the muscular disorders of various convulsive paroxysms as carefully as ophthalmic surgeons do at paralysis of the ocular muscles, our knowledge of convulsive disorders will not advance in an orderly way. The ophthalmologist would not tolerate the describing the phenomena of various visual illusions, produced by paralysis of muscles of the eye, as "Strabismus;" and we ought to try—although this is a far more difficult matter—to get faithful descriptions of actual occurrences in fits. And it must be admitted that it requires very high descriptive powers to describe what takes place in some cases of temporary disorders of motor function of the Nervous System.

very fortunately, cases in which the symptoms of unilateral muscular disorder refuse to be classed as either unilateral epileptiform seizures, or unilateral paralysis, or unilateral chorea. These cases are, I hold, of extreme value in leading to an organization of our knowledge of altered physiological conditions higher than an arrangement of symptoms in groups as epilepsy, chorea, &c. Ophthalmologists will be the last to purposely put amaurosis in association with the abstractions we call "genuine epilepsy," "real chorea," &c., when it is at all possible to avoid doing so.

I have suggested* that epileptiform seizures occur as the result of disturbance of the function, not only of many and of various divisions of the brain, but of parts in particular arterial regions, and that unilateral seizures are the counterparts of hemiplegia, such as results from plugging of the† middle

* As regards epilepsy, it would be better to think from the general law, if it be a law, that any region of the nervous system may *temporarily* fail in function. And, as I have said, instead of trying to see if in any one disorder the whole of the symptoms constitute "genuine" epilepsy—whether, for instance, real, true epilepsy is always attended by convulsions, or always "causes" loss of sensibility, &c.—I would describe disorder of function of the nervous system, or part of it, whatever it was, from spasm of the hand to general convulsions, from temporary coloured vision to spectral illusions, from occasional vertigo to actual incoherence. We might then, if the study of the phenomena disclosed any order with known healthy states, speculate on the organ, or organs affected, and on the Tissue changes which give rise to each of the disorders of function. I would, however, as I have said, *begin* the study of disorders of nervous functions by working at those disorders in which the outward phenomena are most simple and definite, *e.g.*, unilateral convulsions, in some of which the local disease is decided.

† When the convulsion is of the right side there is occasionally temporary defect of speech after the paroxysm, but this, I believe, occurs sometimes when the left side of the body is convulsed. This is a point to be studied. I used to call this defect Epileptic Aphemia (see Med. Times and Gazette, April 28, 1866). This temporary loss of speech may be compared and contrasted with temporary loss of sight—epileptiform amaurosis—which sometimes occurs with it.

In hemiplegia, from disease of the corpus striatum, the paralysis is chiefly of the limbs and not of the trunk ("Lectures on Hemiplegia," Lond. Hosp. Reports, Oct., 1865, vol. ii.) A little of the face is affected, and I

cerebral artery. These seizures occur, I speculate, as the result of impairment of nutrition of parts in the region of the middle cerebral artery, which impairment does not go on so far as to destroy the structural integrity of much of the motor tract. In cases where the epileptiform seizure is followed by hemiplegia, the structure of the motor tract must be itself degraded, more or less, as the degree and permanence of the paralysis shew. This speculation on arterial regions is an unverified one, and its only claim I urge is that

have (*op. cit.*) drawn attention to the fact that a hemiplegic patient may be able to close both eyes when he cannot close but the one on the paralysed side alone. Now in unilateral convulsive seizures (see Case XVI, p. 72) the trunk is convulsed too. Moreover, there was, in the case referred to, lateral deviation of the eyes to the side of the body convulsed. M. Prevost has, in a valuable paper, Gaz. Hebdom, Oct. 13, 1865, recently drawn attention to the fact that lateral deviation of the eyes, from the side paralysed, occurs for a short time in some cases after sudden cerebral hæmorrhages which produce hemiplegia. This symptom has, however, I learn, been described by Dr. Gull, in his Gulstonian Lectures, Med. Gazette, 1849. Now, it is, I submit, most important for ophthalmic surgeons to note the resemblances and differences betwixt hemiplegic palsy, and hemiplegic convulsion, if it be only because they will observe facts bearing on the physiology of the movements of the eye. Yet the study of one isolated symptom would lead through narrowness to incoherence. I referred to this symptom—speaking from the researches of Vulpian, Clarke, and Hutchinson—Lancet, March 24, 1866—chiefly with the object of shewing the importance of deviation of the eyes in epileptiform convulsion (see papers by Dr. Humphry, Mr. Lockhart Clarke—who long ago told me of his observation of this symptom in hemiplegia—Dr. Russell Reynolds, Dr. Broadbent in the Lancet, vol. i, 1866. Mr. Hutchinson has been for several years in the habit of pointing out this symptom as one of those which occasionally occur with laceration of the brain). I now wish to allude to Dr. Broadbent's researches more particularly—Lancet, May 5th, 1866—on this symptom. His views seem to me to put this odd and curious temporary muscular disorder in its proper place with other symptoms in hemiplegia. The phenomena of some unilateral epileptiform seizures, *e. g.*, Case XVI., p. 72, confirm, I think, the views he has put forward as to how it is that the muscles of the trunk escape in the common form of hemiplegia, and his views help very much to make clearer the hypothesis I have put forward as to the relations of unilateral chorea, unilateral epileptiform seizures, and unilateral paralysis. In cerebral hæmorrhage the eyes are turned from the paralysed side in the direction in which the face is deviated. In Case XVI, in the fits I witnessed, the eyes were turned, as the mouth was drawn, to the side of the body convulsed.

it seems to lead to a reasonable method of investigating the order of symptoms in disorder of function of the brain. If it leads to work on a methodical plan it will do good. But if it check work by "explaining" things, it may be suspected of want of that inherent vitality which true method has in itself to open out more and more work.

But in Case XX. there was, *i.e.*, in the first fit, besides the unilateral muscular symptoms, disordered vision; and in plugging of the middle cerebral artery, vision is not even temporarily affected, *so far as I know*. I will now speak of the temporary defect of sight, and then return to this discrepancy.

This, at that time, trivial symptom to the patient, had to me great interest. As the unilateral convulsion was followed by unilateral paralysis, so the temporary failure of function of the eye* was followed by loss of its function.

More frequently, I believe, speaking of unilateral epileptiform seizures, just the reverse happens; the temporary disorder of sight rarely passes into a loss of sight; whilst the temporary disorder of the muscles of the limbs of one side not unfrequently passes into paralysis. What connection there may have been betwixt the "eye symptoms" and the "side symptoms," it is impossible to be sure, but it is fair to speculate. I have suggested, Medical Times and Gazette, April 30, 1864, that they were connected in this case, because the middle cerebral artery supplies parts of *each* optic nerve (*i.e.*, including commissure and optic tract), as well as the corpus striatum, and much of the hemisphere, and that the whole of the parts in the range of this vessel suffered first all temporarily, and then all permanently. Here, however, the paralysis of the limbs passed off, so that the condition of the nerve tissue of the corpus striatum, *i.e.*, the corpus striatum as a whole, returned nearly to a state of health, whilst the optic nerves remained diseased. And no doubt there is some permanently abnormal

* I use the word eye, because I do not just now venture to speculate as to the exact part of the Optic Nervous System affected.

condition of the right hemisphere, which permits the occasional spasms of the left side of the face, left hand, &c.

I think the study of the divisions of the nervous system, according to its blood supply, is worthy the attention of ophthalmologists. Indeed, I feel pretty confident that work on this plan will enable us to arrange in a real order symptoms oddly mixed as disorders of function of parts of the Nervous System, especially those disorders that are temporary. And it seems to me to be reasonable to suppose that the calling out of healthy function of nervous organs, as well as disordered function, depends, *i.e.*, as one link, on alterations in blood supply; and that thus the arteries of the brain are not to be thought of altogether as pipes conveying nutritive material, and carrying away the excreta of organs, but as schemes also for the orderly development of possibilities of function. They have contractile walls and nerves. Whether the function of parts of the brain be brought out in health by actual contraction of vessels, as I have just suggested, or not, it is impossible to be certain, but the function of the retina is roused, in a disorderly manner it is true, by a pressure on the globe, which pressure tends to empty the vessels which supply the nerve expansion with blood.

Again, the disordered muscular action of the hand, &c., "partial fits," which now and then comes on in patients subject to complete unilateral spasm, as in Cases XVIII. and XX., and which, indeed, often precede the full attack, seems to me to be undoubtedly due to feebleness of nerve tissue, as the muscles occasionally convulsed are often permanently, although partially paralysed. The blood binds together the vegetal life of all tissues and the functions of every organ. And the arteries of the brain evidently knit up scattered threads of function. Here the warp of Life is seen distinct from the inseparable woof of Function. Parts which have no relation by continuity of function have one by community of nutrition, and thus suffer together in disease. Hence it happens that we find symp-

toms so oddly assorted as subjective sensations of smell, spasm of muscles on one side of the body, insensibility, and when the whole fit is over, defect of speech (see Medical Times and Gazette, 1864, vol. i., p. 168), or as in Case XX., subjective visual symptoms, spasm of one side of the body, and insensibility.

The above speculation is, as I have already said, an unverified one, but it may, I think, give order, at least for a time, to some of our scientific labours. The arterial relations of the whole Optic Nervous System ought to be carefully studied for the most common reasons.

I some time ago tried to show—although I succeeded very imperfectly—that the parts of the Nervous, Muscular, &c., Systems might be arranged on a plan corresponding to that of the Vertebral Scheme of Professor Owen. I still think there is much truth in this idea. The line of order in such a scheme is one according to continuous differentiations of functions; and, I imagine that the order of another scheme may be from development according to lines of nutrition or of arterial supply.

As Case XII. shews (see also footnote, p. 436), damage quite limited to a part of the hemisphere sometimes gives rise, at the exact time when it happens, to coloured vision. It would be easy to say, adopting some of the views of the day, that the sudden tearing up of structure caused a liberation of tension, which induced contraction of the vessels of the whole arterial region, including the optic nerve, in which the part damaged lay; or that the symptoms arose from "ground currents" affecting wide-spread fibres of the optic nerves, and also those going to the limbs. Indeed these views may each contain an indistinct view of the truth. I have several times alluded to the fact, that disease of one of the hemispheres gives rise to amaurosis, and to the fact that apparently either of them may be diseased without any defect of sight. This last remark applies equally to epileptiform seizures, and, probably, to the intimate changes

which permit them. As I suppose each hemisphere receives fibres directly or indirectly from each retina, "irritation" in *one* hemisphere might produce *temporary* affection of sight in *both* eyes, although local damage might not produce *permanent* defect of vision.

We shall, I believe, receive hints as to the explanation of the occurrence of optic neuritis of both eyes from disease of one hemisphere, by considering from another point of view the relations of unilateral spasm and unilateral paralysis. (see footnote on Deviation of Eyeballs.)

In hemiplegia the muscles of the trunk are not paralysed when the corpus striatum is damaged. Now Dr. Broadbent* accounts for the escape of the muscles acting bilaterally by supposing—not that these muscles are unconnected by fibres with the higher parts of the motor tract—but that, through a common nucleus, they are doubly connected; and, thus, when one corpus striatum is damaged its fellow is still sufficiently connected with the common nucleus to empower the muscles acting together on the two sides. Now, it seems to me that the phenomena of Case XVI., in which the corpus striatum was, so to speak, "stimulated," confirm Dr. Broadbent's hypothesis. In that case, the muscles of the trunk were in spasm, because their nucleus was "stimulated" from *one* corpus striatum. Dr. Broadbent, I understand, applies his hypothesis to sensory as well as to motor phenomena. The fact that disease of *one* hemisphere is attended by amaurosis of *both* eyes may seem to negative the idea that each hemisphere receives fibres representing each eye. But we must remember that disease of even a very large part of the hemisphere *does not produce* amaurosis, although —I may seem to be speaking paradoxically—amaurosis not unfrequently occurs as a consequence of damage of one hemisphere. Amaurosis from optic neuritis is not due

* See Dr. Broadbent's paper, Med. Chir. Rev., April, 1866. An abstract of it is published in Ranking's Abstract, vol. i., 1866. Lancet, May 5.

to a loss of *function* of some nervous structure, as loss of speech or hemiplegia is, but is evidently a part of wide nutritive changes, which spread, it is most probable, not along nerve fibres, but along the connective tissue of blood-vessels, in arterial regions—possibly in vaso-motor regions. The phenomena of unilateral epileptiform seizures at least illustrate the production of double amaurosis from disease of one hemisphere.

Yet, in spite of the facts which appear to show that the position of disease, so far as producing optic neuritis goes, is of little consequence, I do not attach so much value to any of my speculations, but that I would still urge a more careful examination to render this more certain, or to show that it is only partly the truth. I am most anxious to keep the annoying difficulties of the subject before me. I have no wish to conclude, and the speculations I put forward are only of value to me so far as they stimulate work and give order to it. Independently of any theory, we ought, I submit, to locate the damage to the hemisphere, which occurs with optic neuritis, as carefully as we can, especially when the disease is near either of the corpora striata. Although widely distributed, the optic nerve fibres may yet have particular foci, and it may be that these foci are situated so far forward as, or even anterior to, the corpus striatum. Whatever hypothesis might seem to be true, one would not deny that the nerve fibres of each of the special senses, even those of hearing, some more and some less, spread directly or commissurally to every part (although more perhaps to some parts) of their periphery, viz., the convolutions of the cerebral hemispheres. There seems to be reason for believing that every part of the arm is represented in each part of the corpus striatum, and that, thus, the corpus striatum is, in Spencer's sense, a mass of physiological units. Similarly it may be that the special senses, &c., are represented widely in each cerebral hemisphere, and thus that much even of both the hemispheres may be

destroyed without affection of sight. I may just remark that I believe the complexities of nerve fibres and cells are best studied from a consideration of the comparatively simple experiments damage of the corpus striatum makes. To this part of the question of Evolution of Movement I have referred in a footnote to a Lecture on Cerebral Hæmorrhage, London Hospital Reports, vol. iii., p. 238-9.

Indeed I confess that, in the absence of more precise facts, speculations on the relations of coloured vision and spasm of one side of the body, are not very profitable. We want first, I am convinced, more observations on the gross associations of the symptoms, in many cases, one to another, before we can speculate on their causes, or why they come together; for coloured vision leading to amaurosis, and unilateral muscular disorders are not, as I have said, often found together. Complete amaurosis with either hemiplegia or unilateral spasm is not common.

It may be urged that temporary defects of sight are unimportant. Perhaps they very often are in a narrow practical sense. In the case I have just related such a defect of vision was a warning of real evil. This, however, was not a simple case of epileptiform amaurosis. But I willingly confess that I do not know what ill meaning temporary defects of sight have, as I have not yet been able to trace many cases. It is important to consider Case XII. in which temporary coloured vision, from tearing of a particular part of the brain by blood-clot, was followed some time after by amaurosis.

Such symptoms may, I think, be usefully put in the same category for study—not put aside with them—as the so-called auræ of epilepsy or partial fits. If a man were to have twitchings of one hand, of one leg, or of one side of the face, I should fear, although I should not be able to predict with a feeling of certainty, that he would have epileptiform seizures of much wider range, and that he might have unilateral paralysis. A case of this kind I have recorded—*Medical Times and Gazette*, January 31,

1863. So, if a patient were to have sudden and temporary coloured vision, or temporary loss of sight, I should fear such a symptom might be the first warning of severe cerebral disease, in which amaurosis would be one of the symptoms. No doubt, attacks of temporary loss or defect of sight may occur for years without any very bad permanent results. The sight of the woman Julia W., whose case I recorded in a previous paper, has remained good. Still I know that complete unilateral convulsion may occur and not be followed by paralysis for years, and hemiplegia may then come on. And, in the same way, I should fear that temporary disturbance of the functions of the retinæ might depend on slight changes in the brain, on increase of which, loss of visual function might follow.

I was once consulted by a cabman whose sight left him temporarily altogether when he was driving. I could not ascertain from him that he had had any other symptoms. Some time afterwards he told me that he had learned that his wife had kept from him the fact that one night he had a convulsive attack, before he consulted me for temporary defect of sight. In this case the temporary loss of sight was doubtless part of a fit—an abortive fit.

I have considered together temporary loss of sight and temporary coloured vision. The former seems to be the analogue of loss of sensation and paralysis; the latter of pain and spasm. As I have said, I adopt the views of my colleague, Dr. Radcliffe, so far as this, that I believe pain and spasm are signs of enfeeblement, and not of exaltation of nervous function.

I may, before leaving this part of the subject, mention that Mr. Zachariah Laurence has written a very able and interesting paper in the British Medical Journal on functional affections of the retina.*

* These subjective sensations, properly considered, lead us to think of the vast modifications of sensation which occur in the hemispheres, as well as of the modifications of motion—of various degrees of Perception, as well as of various degrees of Expression. And just as—to take a limited part of Ex-

Such symptoms are often called Functional. If Functional means that the alteration of nutrition is so slight that health is apparently easily and perfectly recoverable, well and good; but if it mean that the symptom is not of serious import, I should question the advisability of using the term. I fully admit, then, that I do not know the meaning temporary coloured vision has to the doctor, and I do not think it profitable to speculate on its cause, except so far as the speculation opens out practicable fields of research. I have no doubt that temporary and definitely recurring attacks of coloured vision do depend on alterations of tissue in some part of the nervous system, just as I have no doubt that temporary and definitely recurring spasms of the hand do. Our work should begin

pression—we think of degrees of all defects of motion from the imperfect utterance of words up to incoherence, so we should think—to take as an illustration a limited part of Perception—of all defects of sensation from coloured vision to spectral illusions. Defects of speech occur from damage near the corpus striatum, because here the groupings of motor or motor-impulse nerves narrow towards a connection with the immediate instruments of motion. This knowledge of location of damage which disorders the most elaborate form of expression by motion—I do not say the seat of some conventional bundle of motions tied tightly by technical words into a "faculty"—will urge us to ask where the complex impressions from the several sense systems—not "end" but—embrace the cerebral systems of motions and motor-impulses. It is easy to say this point is the thalamus opticus. Indeed it may be that here the various threads begin their simplest interweavings, as the groupings of fibres for the simplest weavings of muscle in higher mental operations seem to be near the corpus striatum. But I should think the highest groupings of sensory nerves are continuous, deep in the cerebrum with the highest groupings of motion.

Generally I have taken defects of motion as illustrations of a possible common ground of work betwixt ophthalmologists and general physicians. It is obvious that motion and sensation are everywhere interweaved. In the eye sensation is chief; motion subordinate; in articulation sensation is subordinate and motion chief. In one motion is the servant of sensation; in the other sensation is the servant of motion. In the higher evolutions of motion and sensation, no doubt, the two phases of nerve action are so intermingled that incoherence (whatever the most striking phenomenon may be) is a defect in the highest evolutions of both motion and sensation, of their widest interrelations and associations.

by studying phenomena, and part of it should be, at least, I think, an attempt to define most carefully the circumstances under which these sudden failures occur, and we may hope then to get to know on what they depend and what they foretell. In my experience, when these temporary defects of vision are accompanied by any local symptoms, the most frequent one is numbness or spasm of one side of the body. However, in severer epileptiform seizures, the defect of sight will be, as it were, covered up by general insensibility.

Now, I confess that we are likely to get wrong by studying things very minutely, as well as by studying cases broadly. I recognize also the danger we are in in receiving the reports patients give of their subjective sensations. In spite of these drawbacks, as such symptoms exist, they must be studied as well as we can study them, and we should attempt to put them in some reasonable kind of *order*. Temporary loss of sight occurs alone, and I have called it Epilepsy of the Retina. This term perhaps is objectionable in that it carries the theory that the retina is solely at fault. Epileptiform amaurosis might be less objectionable. Such terms are useful so far only as they put these temporary defects in the right group for study, but worse than useless if they put an end to investigation by "explaining" them away. The affinities of these temporary failures of function of the optic nervous system are, I really think, undoubtedly with chronic convulsive seizures, with temporary loss of speech, and with temporary states like somnambulism. These epilepsies must all be studied, in order that by arriving at the knowledge of the things in common we may get a natural plan of studying each individual epilepsy as a departure from health of Tissues, Organs, and Functions of the Brain. The ophthalmologist has excellent opportunities of studying temporary disorders of Function of the Nervous Tissues of one Organ, viz., the retina. Temporary defect of sight is, I think, the same in *idea* as is the tem-

porary somnambulism into which some people pass as suddenly as others lose their sight or their power of talking. They are both temporary conditions of tissues of nervous organs, although of very different organs—the retina (?) and the hemisphere.

Here Case XXI.

This case is one of great importance. Looked at superficially, it resembles Case VIII. The subjective sensations of smell, sight, and hearing, which this patient had, are extremely interesting; and these, considered with the spasm of one arm, the subjective motion, shew that we have to consider variations of the health of the optic nervous system in relation with variations of the healthy states of many other parts of the nervous system, and not as to whether epilepsy "causes" amaurosis, &c., &c. To speculate on the internal conditions on which the whole of this patient's symptoms depend would not be very profitable. It would not be difficult to bring them into order according to the views of the day. The difficulty of walking might lead some to think the disease is of the cerebellum.*

* In general, disease of the cerebellum is the last thing I think of when I see a patient walking in a disorderly manner. In fact, disease of the cerebellum, *i.e.*, disease of the cerebellum so limited as to constitute a physiological experiment, is a very rare thing indeed. Abscess of this part of the Nervous System is so attended by acute general symptoms that cases of this kind would not often be proper evidence. Then disease is often limited to one side. I would here, however, urge, as one fragment of study, a general consideration of the cases in which optic neuritis occurs with difficulty in walking, *i.e.*, a difficulty without obvious paralysis. Such cases should be compared and contrasted with cases of Locomotor ataxy. I have now under my care a case (see report, Lancet, March 31, 1866), of Locomotor ataxy, in which the phenomena, superficially read, are like those of Betsy S.'s case. I have remarked on the class of cases to which Betsy S.'s belongs, Med. Times and Gazette, June 17, 1865. For fear of being misunderstood, I may say that I only group optic neuritis with difficulty of walking as a mere approximation to studying certain phenomena. The sort of difficulty of walking must be studied in each case, and in short we want, as I have urged in several places, a knowledge of the laws of movement from health to paralysis, rather than accounts of cases of Locomotor ataxy, &c.

The cerebellum may be involved, but I think the disease cannot be limited to one of its lobes, or there would not be so much difficulty of movement. I think the disease must be chiefly of the left cerebral hemisphere, and probably of its anterior lobe; but I equally think there must be disease lower down, and away from the cerebral hemisphere, to produce the deafness. For, so far as I know, deafness to any considerable extent does not occur from disease of the cerebral hemisphere. This may be due in part to the wide connection which hearing probably has with mental functions. Probably fibres from the auditory nerve through its nucleus spread more uniformly to the cerebral convolutions. There can, I suppose, be little doubt that the auditory nerve does send fibres to the hemispheres directly or commissurally. The chief reason of the escape of this sense, or of its being less affected, is, possibly, that its vascular (nutritive ?) relations with the hemisphere are less.*

The fact that a large part of the auditory nerve goes to the cerebellum might seem to countenance the idea that in this patient the cerebellum is diseased. The disease, if in the hemisphere, cannot be, one would think, very near the

* I have (Lancet, June 16, 1866), spoken of the importance of considering the relations of each of the special sense systems to the hemisphere [and of course to other parts] in three ways: 1st, Geographical; 2nd, Physiological (Functional); 3rd, Vascular (Nutritive). The olfactory and the auditory nervous systems stand in good contrast. (1.) The olfactory bulbs are near an important part of the great intellectual centre—the hemisphere. The auditory nucleus is continuous (Lockhart Clarke) with the vagus nucleus, the centre so-called of animal life. (2.) The functional connections of smell and hearing with the hemisphere, although not equally important, are equally significant. (3.) The vascular connections are widely different. The vascular connections of the olfactory nervous system ought, I think, to be very carefully considered. Subjective sensations of smell ought to be compared and contrasted with subjective sensations of vision. My experience of subjective sensations of smell and sight is too narrow to enable me to help much in this comparison and contrast. Alienists see the former, and Ophthalmologists the latter. I refer to one case (Case XXIII.). The geographical, functional, and nutritive relations of the whole of the sense nervous systems are worthy of the most careful study by Physicians, Ophthalmologists, Physiologists, and Psychologists.

corpus striatum, or there would probably be both some defect of speech and a little paralysis of the limbs of the opposite side of the body. Yet the unilateral movements in the fit the girl had, satisfy me that there is disease more or less nearly related to the higher part of the motor tract. I used the expression *in* the hemisphere, as I have seen a tumour which had grown in the fissure of Sylvius, and it had displaced the frontal convolutions; but not having involved them, nor the corpus striatum, there had not been either defect of speech or paralysis of the limbs of the opposite side of the body until the day before the patient's death. He had been amaurotic. The case was that of a young gentleman who had been under the care of my colleague Dr. Radcliffe and Dr. Ruttledge. In Betsy S.'s case it may be that a tumour has had such relations in the fissure of Sylvius. I imagine the loss of smell to be the result of disease in the hemisphere, and not to be caused by disease involving any known part of the olfactory nervous system. Whilst we know that disease of the hemisphere is attended by loss of smell, the way in which the symptom is produced by disease so placed must remain unknown. The speculation that anosmia occurring with cerebral tumours is often the result of an olfactory neuritis, may be a useful one for arranging our thoughts, and for guiding investigation, but it must remain a speculation for some time to come.

See Case XXII.

It is most important to give a place in our thoughts to the slightest one-sided symptom. Unilateral epileptiform fits may affect but a limited part of that physiological region which they occasionally fully involve. Thus there may be spasm of the face, of the hand, of the leg, and these symptoms are sometimes called by the name aura.* "First symptom"

* Here, again, I will urge the general study of varieties of movement to which I have so often referred. Taking one physiological region—that of the limbs—I would study conditions of muscles according to the part of this

is a better term, as it involves no theory, and yet gives us hints as to the desirability of studying what functional region or part of the brain is first disordered, in order that we may seek in a reasonable manner where the epileptic process begins in the brain, and thus get a clear idea of where to look, after death, for those minute abnormal changes which are the permanent part of that unknown process. In this way coloured vision and subjective sensations of smell, and limited subjective motions, are important, and with other symptoms may point to disease of particular regions of the brain; but we know too little of permanent defects of smell and sight to enable us to begin to conclude on the causes of temporary defects of these senses.

It is quite clear that impairment of smell, from slight defect of the olfactory nerves, cannot be estimated as slight defects of the optic nerves can. Although this patient can smell peppermint, she may have a condition of the olfactory nerve as abnormal as the condition of the optic nerve in Case XXVI. That man thinks he sees well, although

region most affected, according to their *variations in time* from the voluntary movements of health, through nearly constant irregular movements, continuous rigidity, contractures, and occasional spasm to more exact periodical seizures. And I would, almost advisedly, be careless of naming cases from most marked set of symptoms, chorea, or epilepsy, or paralysis. The laws of the evolution of movements will, I think, be studied at the same time. When the spasm, of the hand, "partial fits" are witnessed, it will be found that they are not of one anatomical set of muscles, as of extensors or flexors, but that there is one contending spasm of all the muscles which go to the hand. It is a defect in the highest range of Evolution. The study of hemiplegia leads me to the belief that the whole of the arm is represented in each part of the corpus striatum (Lond. Hosp. Reps., vol. iii, p. 238), and I think the phenomena of unilateral chorea and of some unilateral epileptiform seizures also illustrate this. I imagine that, however much the hand may appear to suffer alone, it suffers in the most highly developed and the part most represented of the *whole* limb. In general every act is a physiological unit in Spencer's sense of the term. However, I am here supposing, what probably most of my readers will not grant, that unilateral palsy, unilateral spasm, and unilateral irregular movements are various states of defects due to changes in what I may call the middle-cerebral-artery system.

there are striking changes to be seen in his optic discs, and in his case, too, the olfactory nerve may be affected, although he can smell peppermint and taste cinnamon. It is indeed very important to bear in mind the possibility that, as is the case with the optic nerves, the other special sense nerves may be obviously damaged without great interference with their function.

The fact that there was no permanent or long-continued loss of speech in Mrs. S.'s case makes me think the disease cannot have actually involved what I may call Broca's region. The temporary loss of speech was due probably to temporary conditions of nerve tissue of this part—probably some may say to spasm of its vessels—changes which we believe to exist in epileptic hemiplegia, but which we have never defined. I have little doubt, however, that there is gross disease in the left hemisphere in some relation to the motor tract, if not to Broca's aspect of it.

Now this case is another of several exceptions to what I once thought to be almost a rule, viz., that disease of the right hemisphere is more likely to give rise to amaurosis than disease of the left one. (See Postscript, p. 306.) I stated correctly the facts I had observed. I was to some extent wrong in not looking for amaurosis in certain cases of right hemiplegia, namely, in such cases as those in which there was considerable loss of speech. See Cases XII. and XIV. However, I may excuse myself by a consideration of the fact that, as far as I know, no one has explored the eyes of speechless patients as a matter of routine. I have only omitted to do what every one else has omitted to do. The following case shews the necessity of using the ophthalmoscope in cases of loss of speech. In relating it I purposely avoid exaggerating the ophthalmological aspect of it. Indeed that part of the case is the least striking. I wish to give place to the whole of the symptoms with which amaurosis does occur.

Case XXIII.—(Richard A.)

Now in this case the patient's sight was not affected *because* a part of his hemisphere was injured. There can be little doubt that the corpus striatum was much broken up, and that many convolutions were damaged at the very least in the sense that their connections with the motor tract were to a great extent destroyed.* In the Mirror of the Lancet, Dec. 1, 1866, is the report of the case of a patient who was under my care in the London Hospital, and whose case was so like that of Richard A. that I think it most possible that Richard A. had a similar kind of damage to his brain. However, as there was no autopsy in Richard A.'s case, Case XII. may be compared with the case published in the Lancet. Now, in the latter patient there had been no changes observed in the optic discs up to his death.† This shews that damage to a certain important functional region of the brain does not produce optic neuritis, but is the indirect cause of it. I have considered—I by no means say I have explained—this apparent paradox in a previous page. It may be that, had the patient whose case is reported in the Lancet lived, he might have had optic neuritis, not because he had loss of speech, but because he had a foreign body in his brain. The fact that this foreign body was in this particular region was not of great importance so far as the production of amaurosis is concerned. I mean that the fact that it lay in a locality of high function does not appear to be a very important one. But as this region is also the most vascular part of the brain, the presence of a mass of disease here may be more likely to be followed by amaurosis than disease in other parts of the brain. Optic neuritis is not, however, due to an absence of a greater or smaller quantity of nervous

* The other day I made a post-mortem examination, in which there was a large clot outside the corpus striatum. There is in an uninjured brain no room for a large clot "outside" the corpus striatum. In this case the convulsions seemed, as it were, *split* from the corpus striatum and the clot lay in the gap.

† A fact which unfortunately I omitted to state to the reporter of the Lancet.

structure, as loss of speech is, but to the presence of a mass out of its place. The other day I made, with Dr. Hooper May, of Tottenham, a *post mortem* on the body of a man who had been speechless for nine years, and hemiplegic of the right side. Yet, although many convolutions of this man's brain seem* to have disappeared, there was no discoverable defect in his optic discs when I looked at them a few days before he died.

Yet, as I have repeatedly said, some parts of the brain are rarely diseased; for instance, I cannot call to mind that I ever saw a blood clot limited to one posterior cerebral lobe. Such points are of importance in our study of the supposed location of "faculties," as well as in our investigation as to the seat of damage which may or does permit amaurosis. For very many reasons the studies of ophthalmologists and physicians must be merged; and they should, I submit, begin, as one point, with amaurosis and loss of speech. Loss of speech is a defect of function. Amaurosis is a disorder of nutrition. The separation of function and nutrition is in one sense arbitrary, but it is at least convenient to look at certain morbid processes from different stand-points.

So far I have spoken of cases of defects of sight in which the changes in the eyes were well marked. But of course I pay attention to slighter changes. The greatest care, however, is necessary that we do not in this, as in other things, attach too much importance to slight circumstances. Again, I have heretofore spoken chiefly of those cases in which the amaurosis has depended on coarse intracranial disease. Indeed I think—I have not concluded—that slight, or wide-spread changes, *e.g.* those produced by embolism, are not often associated with optic neuritis. I trust, if I can decide this point, that the absence or presence

* I have not yet dissected this brain; it was soft and is in strong spirit to harden. This accounts for the general expression in the text. I have to thank my friend, Dr. Mackenzie Bacon, late of Fulbourn, now of Brighton, for this important case.

of defects in the optic discs will sometimes help us in our diagnosis of the nature of intra-cranial disease. From this point of view the examination of the eyes of patients the subjects of chorea is of importance. Yet I do this sort of work apart, so far as I am able, from any preconceived notions as to the state of the nervous system in chorea. At all events most persons are agreed that the changes in the Nervous System in this disease are slight. Indeed, so slight are they that physicians are not agreed, even roughly, as to their position. It is more a faith that there are changes somewhere, than a belief that there are discoverable changes anywhere. Of course the proper thing for us to do is to study first the phenomena in each case carefully, from the broad basis of the evolution of movement, and the conditions of nerve tissue anywhere permitting any kind of defect of movement, and from other general bases. Irregular movements of a sort do occur with spinal disease, but irregular movements in young children are usually different to those observed in spinal disease (as, for instance, of the arms of patients who have disease of the posterior columns of the cord), and point I think—I judge from clinical evidence—to disease of the cerebrum. These questions are really of interest to ophthalmologists, for although the first question may well be the relation of certain intra-ocular changes, when there are any, to particular irregular movements, such a question is only the prelude to wider considerations of what sort of changes of parts of the Nervous System cause or permit both the defect of sight and the irregular movements.

### The Ophthalmological Study of Chorea.

The absence of decided defects in the optic discs in cases of chorea in children is a fact worthy the careful attention of ophthalmologists. I look at the eyes of children the subjects of chorea as a matter of routine, just as I examine their hearts as a matter of routine.

On September 6, I looked at the optic discs of Caroline B., a girl ten years of age, and, as I was sitting down, I remarked to the students that I had never found any striking changes in the eyes of a choreal patient. I found them in this case. The changes were most in the right eye. The optic disc was badly margined; the veins were large and very irregular (wavy); and the disc was hyperæmic. There were similar, but slighter, appearances in the left eye. Now, in this case, as in most cases of chorea, one side of the body—the right—was affected. It was the side only affected. There was, as I believe there always is in chorea, paralysis, and in this case the paralysis was considerable. The child's talking was bad. It was, when I saw her, slightly thick. I took her into the hospital (thanks to the permission of my senior colleague, Dr. Davies). The irregular movements degenerated, into paralysis, so that the arm was almost immoveable and the changes in the optic disc increased. However, she ultimately regained much power, and the discs resumed nearly a normal appearance. She went to a Convalescent Institution in November. The arm was then nearly restored.*

The treatment, the drug treatment at least, of chorea is, of course, interesting to ophthalmologists, as we suppose we are treating conditions of tissues, and not the phenomena, although we find our remedies empirically. Of drugs, Arsenic seems to be by far the best. I would investigate its action, not, of course, as a remedy for chorea, but as a remedy for impaired nerve tissue. Its

* I am pretty confident that this patient had had no severe pain in her head, and no vomiting; but, strange to say, I have no note of enquiries about these symptoms. It is very important to enquire on these points in cases of nervous diseases, as pain in the head and sickness are valuable signs to help us to distinguish whether disease in the head is coarse and local or slight and wide-spread. And it is of importance to make enquiries about these symptoms in all cases of chorea as well as to examine the eyes with the ophthalmoscope, and to examine the heart.

chemical relations to phosphorus—so important a constituent of nerve tissue—are very significant.

I may just mention the treatment of this patient's case. I think few nervous diseases require more care in treatment than chorea. I gave the child good diet, directed her to be kept very quiet mentally and physically, and yet to take exercise. No drugs were given beyond aperients; for, as Wilks has shown many, probably most, cases of chorea in young girls will get well by treatment without drugs. I think it of extreme importance to keep choreal patients quiet when the disease is in its *earliest* stage. I would disturb them in no way, even avoiding cold douche, and, in moderation, decided moral restraint, and, in short, anything that would frighten or excite the children. When the disease became at all chronic would be the time for gymnastics, or for more decided measures.

I use in the above report the vague expression that the child's talking was bad because I have not been able to do much towards analyzing the defective articulation of patients the subjects of chorea. This matter has, from a broad basis, a decided and a direct interest to ophthalmic surgeons.

When I was clinical assistant at Moorfields I used to observe that some patients waiting their turn were obviously squinting, but when they came to speak to me their eyes were apparently parallel. So choreal patients who are reported to talk very badly at home, can often pronounce any word I suggest. So it often is with a certain defective articulation which occurs with hemiplegia, generally of the right side. I have known a hemiplegic patient who talked so badly that it required careful attention to gather and guess what he said, and who could, for all that, utter any single word or sound I uttered. I repeat, these questions are of interest to ophthalmologists when they are thinking, *from* those striking muscular disorders they most often see, to the Laws of Muscular Life. The difficulty of articulation with hemiplegia (See

Case XIV.) is not to be analysed into difficulty in pronouncing palatals, as in diphtherial paralysis, nor dentals, nor labials, for there is no paralysis of any corresponding divisions of the articulatory organs. It is a defect in a higher range of evolution—defect in a higher series of anatomical possibilities.*

## Note on Substitution Nutrition.

I may here allude to the fact that bromide of potassium is better than the iodide in cases of epilepsy, at all events in chronic cases. It may be well to give iodide with it to stop any new changes, but, as a matter of empirical experience, the bromide keeps off the fits far better. The treatment of the patient, Case XX., is, except when there is a new style of symptoms, just like that of Case XVIII., in which the gross local disease is the result of injury. As I have urged, the unknown changes on which the fits depend are in both cases probably similar, and, no doubt, quite alike in this, that the nutrition of certain tracts of the hemisphere is below par.

There can be no question that bromide of potassium is a most important remedy for keeping off fits—I do not say for curing the patient. It is, of course, not precise to

* On the evolution of movements I have spoken several times, especially as regards the arm-nervous-system, *i.e.*, from nerve-trunks supplying muscles directly, to the corpus striatum. From this centre we shall, I hope, be able to trace another series of evolutions of movements, those of speech and thought. I think, too, as I have already said, that this kind of study will be much helped by a consideration of what ophthalmologists have done in their work at paralysis of the muscles of the eye. And ophthalmologists will do more than study such phenomena as paralysis of muscles from disease of an anatomical nerve-trunk, just as physicians do more than study such difficulties of articulation as paralysis of the palate gives rise to. Ophthalmologists will observe carefully the relations and meanings of oscillations of the eyeballs and of lateral deviations of the eyes, which symptoms—the last, certainly—are most likely always caused by deep central disease. If such an expression be permitted, there is a gradual increase in *intelligence* in movements from the lowest nerve-trunks to the highest nervous centres. (See postscript, No. 2, p. 306.)

say that bromide of potassium is a remedy for Epilepsy, but for certain states of nervous matter. I use the word matter instead of tissue as it cannot be certain what is the particular tissue change the bromide helps in. Probably change in nervous tissue is the one it assists. At all events I would urge its use both in cases of the nerve-atrophy of the optic nerve (if I may be so tautological), and in acute optic neuritis, and in the cerebral-atrophy of the optic nerve which follows this acute process, and which atrophy seems to be only secondarily nervous. It ought, I think, to be tried in paralysis of the motor nerves of the eye, and generally in altered conditions of nerve matter.

How substances practically foreign to the organism act in disease is an important problem, and we should investigate their action more generally from the part salts, minerals, &c., play in healthy changes of nutrition, in building structure and in developing function. The chlorides, the iodides, and the bromides are very strikingly homologous in their chemical and physical properties, and I cannot but think the efficacy of the two latter is due to their replacing, as it were, with greater energy the commoner chloride. The fact that large quantities of the chlorides are present in active changes of tissue—the healthy development of cartilage or the uproar of those changes which are rapid and extreme enough to be called inflammatory—is a very significant one. It leads us to consider what share the special crystallising and dialysing powers these substances may have in cell formation and nutrition. I do not see why we should not spend time in watching the changes in a piece of lymph on the iris when we have saturated the patient with an iodide, which salt we know does good, although we are not yet sure it replaces its congener the chloride. Then the different dialysing power of the chlorides of potassium and sodium, and the great differences in their physiological distribution ought to ensure to them also a competitive trial. The value of arsenic in nervous affections gives us

hints of this too. Part of the question of what I would call "Substitution Nutrition" may be investigated in health of plants as well as in disease of higher organisms.

I submit that these speculations, if they have any value, are most in place in a journal of ophthalmology; for ophthalmic surgeons not only see disease of the retina, choroid, &c., but they can *watch* changes in nervous, &c., tissues.

Professor Odling, in his most valuable and delightful "Lectures on Animal Chemistry," has considered the question from his point of view. The following extracts must not be considered as giving a full idea of Dr. Odling's opinions, but they may draw attention to his own more complete account of them. He writes: "It will be found, I think, that those mineral substances which act more especially as alteratives, actually are, and necessarily ought to be, characterised, not by their chemical energy, but by their chemical mobility; and I do not know that I can make my meaning better evident than by directing your attention to the chemical properties of iodine in comparison with those of its intimate congener, chlorine. As I shall presently show you, both elements possess in a striking degree the property of oxidizing various substances which resist the action of ordinary oxygen." P. 146–7.

"Now, while chlorine may be compared to peroxide of hydrogen, it is the sort of chemical mobility manifested by the oxides of nitrogen, which is characteristic of iodine, and, I believe, of most mineral alteratives. Iodide of hydrogen or potassium is, like nitric oxide, a facile reducing agent, and free iodine or hypiodite of potassium, like peroxide of nitrogen, a facile oxygenant—so that wherever the iodine travels it is capable of influencing the processes of oxidation there going on—absorbing oxygen where there is excess, delivering active oxygen where there is deficiency—just as our nitric compound absorbs oxygen from the air, and delivers it up to the sulphurous

acid. It is this chemical mobility of iodine, then, which chiefly distinguishes it from its more active congeners, chlorine and bromine. The general chemical relationship of these three elements to one another is most striking." P. 149–50.

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## APPENDIX OF CASES.

THE following cases are numbered, so as to follow in order the cases related in former papers I have published in this Journal:—

CASE XX.—*Epileptiform Seizures, with Temporary Defect of Sight, followed by Paralysis and Amaurosis—Syphilis.*

This patient (see also Case XVIII.) sometimes stopped his fits by a ligature. This seems to show that although the motor symptoms are chief, the sensory nerves of the skin or the muscles can influence the centre, possibly through its blood-vessels. As I have several times mentioned, I think the vaso-motor nerves are important links in determining the methodical expenditure of force which structure has acquired by nutrition.

George W., æt. 30, was admitted an out-patient at the Metropolitan Free Hospital in the autumn of 1862 for fits. He said that, whilst riding in an omnibus, a few days before, he had a quivering in the left side of the tongue and left side of the cheek. At the same time the eyes became "dim and sparkled." This continued for seven minutes, and then, he having left the omnibus, found that the left arm "was pulled right up." Next he slipped down, and became insensible, he thinks, for about half an hour. He could tell nothing about his condition in the full fit. In a little time he was able to walk from the police station, where he had been taken, to a cab.

Six weeks before he had had a little "working" of the left side of the mouth for about ten minutes. This was the only suspicious symptom of nervous disorder until the attack for which he came to me.

His general health was good, except that he had pains in the

limbs, and these pains were worse at night. For them he had been attending, as an out-patient, under Mr. Hutchinson's care, who had given him iodide of potassium. Two years before he had had chancres, followed by buboes. He had, however, had no other symptoms of secondary syphilis.

He did not attend again, but as I wished to know what had become of him, I sought him out, May 1863, and found that he was blind of the right eye completely, of the left partially, and he had paralysis of the left side of the face and of the left arm. The leg was scarcely affected. The facial paralysis was limited, as it usually is in the ordinary form of hemiplegia.

I learned that a week after I had seen him he had had another fit. His face was black, and he bit his tongue. Next day he was sleepy, and kept his bed. The left arm was useless for several weeks, and he lay in bed in a semi-insensible state. Since he had had no decided fits, but he had had little attacks of spasm of the face, of the left side. The optic discs were white, badly margined, and the vessels seemed to be strangled in it. There was now, I found, a node, tender and fluctuating, over the right parietal eminence. This soon went away with the iodide of potassium in ten grain doses, and, except for the blindness, he got into good health again. I admitted him into the Metropolitan Free Hospital, and during his stay he had one attack of spasm of the face, affecting, he showed me, only the part of the face which was paralysed. The paralysis gradually diminished, and he went out, except for the blindness, in good health.

This patient then went to an ophthalmic surgeon, Mr. Hulme, at the Central London Ophthalmic Hospital. Mr. Hulme had the great kindness to send him to me at the Hospital for Epilepsy and Paralysis in 1863. The patient was still blind of the right eye, but the sight of the left had much improved.

January 1865.—He came to me at the London Hospital for an ulcer two inches in diameter on his sacrum. It looked, from position and from its general shape, like a bed-sore. Under the iodide in doses of fifteen grains three times a day, it healed up in about two months.

On March 25, he said he had had a fit. He first had a *sparkling before his eyes*, then a twitching in the left hand, then fell, and became insensible; he bit his tongue. A few days later he had an attack, which affected sometimes the left hand, and

sometimes the left side of the face, and for two hours it prevented his keeping his head still on his pillow. He had a numbness of the left side for several days after. He several times had twitching of the left hand.

After this he occasionally complained of various odd feelings in the left hand, twitches, and of a sensation of pins and needles, and sometimes of flashes of light before the eyes, but these flashes of light came on at different times to the twitching of the hand. He has no defect of smell.

He had also occasionally pain in the neck and head enough to prevent sleep; and there was some tenderness of the scalp, but no node.

October, 1866.—He is still under my care for occasional slight and partial fits.

CASE XXI.—*Amaurosis, Anosmia, Cophosis—Subjective Sensations and Convulsive Attacks.*

Betsy Smith, æt. 18, sent to me by Mr. F. M. Mackenzie, was admitted into the London Hospital, March 25th, 1866, with loss of smell, blindness, deafness, and a certain difficulty in walking.

She had been ill two years, and began by "staggering and reeling about like a drunken person." She said she was not giddy then. About this time pain in the head began, and she has had it, on and off, ever since. It was at the vertex and front, and has been in the occipital region, when the blindness occurred. She commenced to be subject to vomiting, when the headache began, and this has continued. Now, when the pain comes on bad, she turns pale, feels sick, and gets up to retch.

I can get no very precise dates. The blindness came on about a year after the staggering, and was complete in about a year. The sight of the left eye went first. It is worthy of note that before her blindness she had temporary losses of sight. It would leave her suddenly in the street. When I first saw her, both optic discs had recovered from an acute stage of optic neuritis; they were anæmic, very loosely margined; the veins were irregular and dark, and some were partly buried on the disc itself. The arteries were visible, but they were very small. In the left eye the appearances were nearly the same. The

patient had lost smell, but for how long was not known. She had then subjective sensations of smells of various sorts; sometimes "like a drain," and sometimes "like spice." These would come on and off, and would sometimes last for a day. She could taste quinine and sugar, but could not recognize peppermint. She is quite deaf of the left ear, and partially of the right, and complains of great noises in her ears.

Now, as to her limbs, she could not use her hands well, and could, when I first saw her, neither extend her fingers completely, nor grasp firmly—indeed the grasp was very feeble. A few days later, when taken into the hospital, she grasped well. Then her hands were warm; before they had been very cold. Her walk, however, shewed the most striking symptoms. She could not walk at all by herself, and when supported, the right leg, she said, dragged. She shuffled it along. When we tried to leave her standing she clutched hold of us, and when quite freed she reeled, and would quickly have fallen unless she had been caught. If carefully balanced she could stand. Her gait was not "staggering," as she had called it, but a swaying, reeling, helpless progress, and was very unlike the staggering, eager walk of locomotor ataxy. Her general health was good.

She was taken into the hospital, and was, by the courtesy of Dr. Parker, placed under my care March 31st. She was in the hospital about one month.

On April 12th she complained of queerness before her eyes, and said "the place just now looks quite white." She said that just before it looked like straw; and, again, "like bubbles of water when the sun was shining." At the same time she spoke voluntarily of a sensation of smell in her nose. These sensations were altogether subjective, and she could neither see nor smell at all. The nurse said the girl wandered, but she seemed to me to be quite sensible, and so far as I could make anything out of the nurse's statement there was nothing to show that the girl's mind was defective. She was quiet and gentle. I mention these observations of the nurse who, unfortunately, was not an intelligent woman, as the girl's stepmother had several times asked me if her daughter was not very likely to go out of her mind. She gave as one reason for asking the question that the poor girl had threatened to commit suicide. Some time later she asked me the same question, but

gave very vague reasons for asking it. The girl was inquisitive; she asked the colour of my hair that she might distinguish me from my namesake, Dr. James Jackson. She was learning to read by a blind book very well.

April 21st. This morning, for twenty minutes, the right arm and leg kept moving. I did not see it, but I judged from the description that it approached tremor rather than cramp. Her speech was not affected, but she said she sometimes lost her speech. This loss must have been very temporary as her mother had never noticed it.

These are the only noteworthy circumstances which happened during the patient's stay in the hospital. Her general health seemed good. She was on full diet, and would, I was afterwards told, eat part of the diet of the other patients as well as her own. I did not then know of this, or I should have given her more food. Shortly after she left the hospital she had a fit. Her mother gave me the following particulars:—At tea one day the child got up to open a door, but suddenly cried out, "Oh, mother, take hold of me!" and then fell to the ground, and the right arm and leg moved, and the mother could not hold the hand still. The girl then cried out "Oh! what a stink! what a dreadful stink in the place!" and then, "Eh! eh! eh!" very loudly, and next went into a sleep and slept for hours. When she came to herself she knew nothing of what had happened, and answered questions.

[*May 7, 1865.—Betsy S., æt. 17, blonde, stout during last ten months; frontal headache and sickness in morning. Deaf and drowsy. First menstruated at 15, once only, and not again till two weeks ago, when after some treatment at St. Bartholomew's Hospital she had some bloody discharge during one day.

Unsteady in walking, and says "my legs give under me."

V. oc. d. qt. pt. oc. s. = No. 2 Jaeger's types.

Ophthalmoscopic signs:—

Oc. d. Optic nerve tumid, tissue hazy, vessels at exit hidden.

* This patient has been under the care of Mr. J. W. Hulke, at Moorfields, and under Dr. Stewart, in the Middlesex Hospital. To Mr. Hulke I am indebted for the above notes from his case-book. Unfortunately, the book in which Dr. Stewart's clinical clerk had made notes of this case was not to be found.

Contour of disc hidden. The opacity of nerve tissue extending into retina = $\frac{1}{3}$ or $\frac{1}{2}$ diameter of disc, beyond this retina clear, its veins swollen and tortuous.

Oc. s. Tissue of optic nerve hazy, not so much as to hinder the contour of the disc, but yet enough to make the central vessels (trunks and primary branches) very indistinct; nerve also tumid.

March 20.—V. oc. d. = qt. pt.; oc. s. = No. 20 Jaeger.

Deafness > Staggers in walking. Headache < Patches of greyish exudation in choroid.

1865. July 13.—Soon after last date she was admitted into Middlesex Hospital, under care of Dr. Stewart, where she caught typhus. Now she is very pale and thin. V. both eyes pt. = o.

Walks less unsteadily. No headaches. Optic nerves tumid, pale, woolly; vessels less hidden, and less swollen.]

November, 1866.—The patient is now, my friend Mr. Frederick Mackenzie tells me, in the Homœopathic Hospital.

### Case XXII.—*Epileptiform Seizures affecting the Right Side—Amaurosis—Hemiplegia of the Right Side.*

Ellen S., æt. 43. This woman was placed under my care by the permission of my colleague, Dr. Davies, Sept. 22, 1866. She had then been in the London Hospital four days. The following history I obtained from her and from her daughter. The mother, although she would readily answer questions, soon became confused, and she gave very different dates at different times.

She had been ill since Christmas, 1865-6. The first thing observed wrong was a fit. She was taken, whilst washing clothes, with a pain in the right arm, "as if it were numbed." The arm next became stiff, and could not be moved, but the face and leg were not affected. This state of things continued for an hour (?), and the daughter went on rubbing the arm all along. Next, the mother made a noise in her throat, and soon after passed into the full fit. She was in this fit—doubtless a succession of fits—from 7 p.m. to 1 a.m. Next day she could use the arm, but she lay in bed six weeks. She kept her bed because she was "very ill," and I could get no exact account of her state. She had much pain in the left side of her head, but no vomiting and no paralysis.

She had no other attacks for two months, when she had the second. She had seven or eight at intervals; sometimes two a day, all of the same sort, before she lost the use of her right side. In some she bit her tongue, in others she did not.

The hemiplegia followed one particular fit. When the fit came on she was at her tea, and it, like the others, began by a stiffening of the right arm. After this attack she could not talk at all for fourteen days, but then she became able to talk.

From that fit to admission she remained hemiplegic, but the fits continued; and she had seven or eight before admission, each still affecting the right, the now paralysed, side. In about four or five of her fits—but in which of them I could not learn—she had been insensible.

After one of these, ten weeks ago, she lost her sight; for one week it was lost completely, but it then improved. After another fit, five weeks ago, she again lost sight, and never regained it.

The above notes date from the day when I first saw her. She was then lying in bed, hemiplegic of the right side, and blind. There was rigidity of the hand but none at the elbow or shoulder joints. The hand was shut, the last phalanx being extended, and the nails with their edges being pressed against the palm. The hand seemed the part most paralysed; she could raise the whole limb—not merely swing it from the shoulder—pretty well. I could not, with moderate force, open the hand, and pulling at the fingers gave her pain. I could make out no loss of sensation by ordinary tests, but I did not use the compasses, as although she could talk she was not quick. The leg was much paralysed, but she could just manage to get along without help. The leg was flexed at the knee, and could not be extended. The face was normal.

She could smell peppermint. She was quite blind. Both optic discs were white and slightly swollen; their edges were ill-defined; the arteries were thin and nearly lost in the disc; the veins were dark and irregular, but they were not very large. She complained of pain in about the mid-parietal region of the left side of her head. This pain did not extend into her face. She seemed in fair general health, and took her food well.

As to the nature of her disease I could not be sure; I felt certain that there was some coarse disease of the left hemisphere,

but of what sort I did not know. I, however, gave the patient the iodide of potassium in ten-grain doses, but not with much hope. The woman's daughter had an ulcer of the leg, which seemed to be undoubtedly syphilitic, but possibly it had been acquired from her husband, and was not the result of congenital taint.

She had a fit in the hospital on the 22nd, and the nurse told me that it lasted from 4 P.M. to 7 P.M. The nurse said the movements were strictly confined to the right arm, leg, and side of the face. The eyes "kept shutting and opening." It was said that the patient was not at all insensible. I asked the nurse if the patient talked. The nurse said no. The patient here eagerly put in a remark, that in her fits "she tried all she could to talk and could not." She added that she could always hear what was going on, and mentioned something that had been said when she was in the fit. However, it is not quite certain that she was conscious throughout. Although she could not talk voluntarily, she did get out the words, "I recollect," twice. She was, no doubt, then partly unconscious. On such secondary-automatic utterance I have spoken at length.—Med. Times and Gaz., June 23, 1866, Jan. 28, 1865; Lancet, Feb. 17, 1866. Lond. Hosp. Rep., vol. i. (See also p. 306.)

The patient was in the hospital about two months, and improved in her limbs a good deal. She could move the whole arm more, and was able to walk much better. The hand, however, remained, practically, useless.

It is quite as likely that the improvement in this case was due to time, as to the iodide. However, the patient improved after it. I have now under my care a patient, who leaves the London Hospital well after Christmas, although he was carried in totally paralysed of the right side two months ago. He took no drugs. No doubt, however, this man had a small clot.

CASE XXIII.—*Case of Loss of Speech, with Hemiplegia of the Right Side—Optic Neuritis—Death—No Autopsy.*

Richard A., 51, was admitted under the care of Mr. Adams for coma October 25th. He had fallen on a scaffold, and it was supposed that he might have received some injury to the head. As the coma cleared away, it was quite evident that the case

was a medical one, and it was believed that the man had fallen because he had had an attack of cerebral hæmorrhage. He was hemiplegic of the right side, and speechless. By Mr. Adams's permission I saw the patient November 24. The man was then, I believed, quite conscious, but he could not talk. He said nothing but "wo," "wo." (Not oh, oh.) He did nothing I told him. He simply stared at me when I spoke to him, and then looked away, still staring, with elevated eyebrows. I was told that he would put out his tongue, but he did not do it for me. The nurse said the patient sometimes smiled. He could eat well, and he could swallow well, as I ascertained by watching him eat a piece of dry bread. The nurse said he never asked for anything, and when he had eaten what he wanted he pushed the rest of his food away. He sometimes got angry, and the nurse fancied that he tried to swear, but he made use of no actual words in the process. He passed his motions under him, and took his fæces in his hands, to put out of bed as the nurse imagined. The man's hands were daubed when I saw him. I managed to see his optic discs. They were normal.

December 4th.—He has been removed to the Attic, and is under the care of Dr. Fraser. The patient still rarely or never says anything but "Wo, wo." Mr. Le Rossignol, to whom I am indebted for much courteous assistance in investigating the case, once heard him say "better."

I now beg particular attention to another matter. The nurse told me that one day, after his son had been long urging him to say if he knew him, the patient uttered this sentence, "How is Alice [his daughter] getting on?" The nurse could not understand the words, they were articulated so badly, but the man's son was certain that the sentence I have mentioned was really delivered. He told me too that his father had given him to understand where his tools were. He asked him the question, and the reply was "master's." This was all that he had ever said.

December 7th.—Nurse says he gets into passions and shakes his left fist at her, and looks vexed, and that he once tried to knock the candle out of her hand. She says he never makes signs for anything, except perhaps that when he wants anything he claps his lips. After much urging, and on seeing the nurse do it for his imitation, he put out his tongue. Generally he opens his mouth instead.

January 13th.—He is in the same general condition—still in bed, and still hemiplegic of the right side. I see him occasionally, and I can never get any reply from him. To use a common expression, "I can make nothing of him." Yet my friend Dr. Woodman, for whose opinion I have the greatest respect, says that for five successive mornings, the man has told the days of the week, *e.g.*, he held up one finger on Monday, two on Tuesday, and so on, but this morning he failed. The noise the patient can make has changed to Pooh! pooh! Indeed, he is generally called the "pooh! pooh! case."

When I saw the man first, that is in November, his optic discs were, as I have said, normal. I then saw them pretty easily, as he took little notice of what I was doing. I examined them again January the 14th, and found that he had well marked neuritis in both eyes. The difficulty in getting a good look at this patient's optic discs is almost inconceivable, and yet, although annoying, it was very interesting. It was, of course, necessary to dilate the pupils, and thus sometimes I could catch a glimpse of the discs. The common formula, "Look at my little finger," was of no use here. When told to do so the patient opened his mouth, or screwed up the eye, or moved his face to one side, or turned his eyes in several directions. I then asked him to look straight forward, but with no better result. I told him to take no notice of me, but this made no difference. Here was a curious state. He knew I wanted him to do a certain thing, but whether ke knew what thing, or whether, knowing it, he was unable to do it, I am not sure. I think it was probably a loss of voluntary control, as in cases in which patients do not put out their tongues when told, there is no ordinary paralysis, and they know what is wanted, as they put their fingers in their mouths, as if to get out the tongue. [On this part of the subject I have written, London Hospital Reports, vol. i, p. 400, and Medical Times and Gazette, June 23, 1866.]

Soon afterwards the patient left the hospital still paralysed, and still speechless. I called on him once, but his wife was out, and I could make nothing of him. I had no light for the ophthalmoscope. The man only said "Pooh! pooh!" Afterwards, my friend, Mr. E. Vialls, went to see him twice. The last time was on September 24th, and then Mr. Vialls learned that the patient had died three months before in a workhouse.

Of course I regret bitterly that I lost the opportunity of adding to the report of the case the facts an autopsy would have given. The case, however, is worth reporting incomplete as it is, if only to show the necessity of some organisation to prevent our studying disease in the fragmentary way we do. The co-operation of those who have charge of patients in workhouses is most desirable in helping ophthalmologists and physicians to follow out their cases. This is especially so in cases of Locomotor Ataxy,* a disease in which the ophthalmologist—I now mean for physiological reasons—is far more directly interested than the physician is.

I have (Ophthalmic Review, April, 1866, p. 52) spoken of the necessity of the study of Locomotor Ataxy by physicians and ophthalmic surgeons. In this group of symptoms there seems to be but one idea throughout. I am under the impression—a mere impression—that it begins not unfrequently with paralysis of the fourth nerve; and paralysis of the inferior oblique dislocates the whole of the movements of locomotion. I think, too, that amaurosis, with a gradually whitening disc, is sometimes the precursor of the leg symptoms.

The other day Mr. Frederick Mackenzie and Mr. McCarthy made for me an autopsy on one of my patients who had died with symptoms of Locomotor Ataxy under my care. This patient had had paralysis of both sixth, both third, and double atrophy of the optic nerves. Mr. Lockhart Clarke has this patient's pons, cord, &c. Surely a case of this sort ought to be studied by ophthalmologists.

I would at least suggest that ophthalmic surgeons should work in the physicians' wards. I have within the last two months had under my care in the wards of the London Hospital, thanks to the generosity of my senior colleagues,

* The questions of the relation of Sight and Touch and of the nature of our knowledge of Space, may, I submit be considered with advantage in these cases. If we are not born with intuitive ideas, we are born with complex anatomical possibilities, in such exact correspondence with our environment that we cannot determine how we acquire some of our notions, for we cannot remember when we were without them. The phenomena of disease seem to show that there are particular internal anatomical connexions betwixt sight and locomotion—that they are, to begin with, in a certain correspondence, so that the two experiences are readily integrated.

Dr. Davies, Dr. Andrew Clark, and Dr. Ramskill, cases which show the importance of doing this. A man, age only 20, with Bright's degeneration of the retina, who consulted me for fits; a man hemiplegic of the right side, and with great defect of speech, who has double optic neuritis; two cases of atrophy of the optic nerves in patients who have had fits of some kind; a boy who had double optic atrophy, and many other symptoms from disease of the crus cerebri and other parts; a girl with paralysis of parts of each third nerve and hemiplegia; a girl with hemiplegia, keratitis, and malformed teeth. Then, for negative facts, there were several cases of chorea. I and my namesake, Dr. James Jackson, yesterday examined five patients the subject of chorea, and found nothing wrong with their optic discs. We examined also four patients the subjects of unilateral epileptiform seizures, and found irregularity of one vein in the eye of one of these four patients.

I have also had under my care a woman the subject of unilateral epileptiform seizures, pains in the head, and vomiting. Her pain was from cranial nodes. There was nothing whatever the matter with her optic discs, except perhaps that they were a little pale, but I mention her case, as it is, in my opinion, a very likely one for after-neuritis to occur in, for it is important not only to recognize the slightest changes in the optic discs, but to recognize under what circumstance optic neuritis is likely to occur.*

### Case XXIV.—*Subjective Sensation of Smell, with Epileptiform Attacks.*

According to the view I take that subjective sensations of all kinds should be compared and contrasted, the following letter from a patient now under my care is of interest in connection with Cases XX and XXI. It is only part of his case, and is inserted here merely as a hint of the necessity of broadening our studies:—

"Sir,—I have much difficulty in describing my first fit, which took place about two years ago, on account of my memory being

* She has since been re-admitted with optic neuritis. As a rule optic neuritis is to be feared when unilateral convulsions are attended by vomiting and headache.

so much impaired by the disease. I was standing by the press preparing a sheet of type for printing; suddenly a sharp smell crossed my nostril: I fell as though I was shot. I was told afterwards, by one of the men that picked me up, the paroxysm lasted about three minutes, during which time consciousness was entirely suspended. When I came to myself I could see the parties that held me. My first question was, what day of the week is it? where am I? Although I could see the parties holding me, I was not conscious where I was. They set me down, gave me some water, and in about twenty minutes I was going on with my work again.

"I felt no more for two months, when one day I felt very poorly. After dinner I laid me down on some chairs and fell asleep. After a short time my family was alarmed at my making a strange noise. They came to me and found me in a strong fit; my hands closed very tight, but no particular distortion of the face. In the course of that afternoon I had about eight fits. The effect produced by them was lowness of spirits, loss of appetite, partial loss of memory, and total loss of smell.

"Four weeks after this I had another, which came on soon after going to bed. I had gone to sleep; I felt a sensation in my head like a squeezing of the brain; it was momentary. I was not conscious again till next morning; whether I had been in a sleep all night or in a state of coma I could not say; my wife said she could not awake me. The effect produced was much the same as before. I continued to have them periodically, sometimes two or three days over the month, and sometimes the reverse, up to two months ago, from which period I had an interval of seven weeks and three days, which brought me up to last Sunday week. Between five and six in the morning of that day I was between asleep and awake, when I felt the paroxysm coming on me. I had no power to move; I made a strange noise; my wife tried to get me up to no purpose. I lay in this way about an hour when I felt it coming on me. I had the power this time to call out "It's coming on me again." This lasted about one hour. When I came out of it I could not remember the day of the week; in fact, my mind seemed to be completely deranged, which feeling I have had on me more or less ever since. It all seems to proceed from the upper part of my nostril; a strange, indescribable smell seems to communicate with my brain. This attack has

been more severe than before. I felt it from my head to the bottom of my feet."

*Postscript No.* 1, *referred to p.* 284.—The following is a quotation from a report in the "Mirror of the Lancet" (Nov. 26, 1864, p. 604), of some remarks I made on "Defects of Expression," &c. First mentioning that the differences in defects in patients who have disordered speech is probably due to differences in the "quantities of brain damaged about the highest part of the motor tract, the corpus striatum—the point of emission of the orders of the 'will' to the muscles," and that damage to the brain in the neighbourhood of the *right* corpus striatum does not produce loss of speech in any sense of the word; I was correctly reported further as follows:—"Now amaurosis is due to disease of *a highly specialized nerve of sensation*, whilst there are good reasons for believing that defect of articulate language, which M. Broca calls aphemia, is a kind of ataxy of articulation, and, therefore, *a disorder of motion*. Again, the contrast may be made more general. Sight is a department of general perception, whilst articulate language is a department of general expression. If, then, it should be proved by wider evidence that the faculty of expression resides in one hemisphere, there is no absurdity in raising the question as to whether perception—its corresponding opposite—may not be seated in the other."

*Postscript No.* 2, *see p.* 290.—Now it is in some classes of cases of disease of the nervous system "hard to say where obviously motor symptoms end, and where the purely mental ones begin. Thus there is (in cases of hemiplegia on the right side) every gradation betwixt, on the one hand, a total loss of the power to express ideas, or a loss of knowledge of the relations of words to things, and, on the other, apparently scarcely more than a peculiar motor defect in talking—an ataxy of articulation. And sometimes in the same case we find that the patient makes mistakes in words, and also articulates badly. In the case of the subject of these remarks there are (1), involuntary ejaculations; (2), involuntary and yet complete actions; and (3), local spasm or twitching of muscles. We may, perhaps, find all shades, degrees, and analogies betwixt obvious and coarse motor reflex actions, and disorder of what Dr. Laycock has described as the reflex function of the brain. We may thus analyse with some success, from the study of phenomena which are superficial and simple, more hidden and intricate mental conditions.—"Remarks on a Case of Involuntary Ejaculations—Chorea," Med. Times and Gazette, January 28, 1865, p. 89.

## ON A GROUP OF CASES OF OPTIC NEURITIS IN CHILDREN.

By Jonathan Hutchinson, F.R.C.S.

The cases in which blindness results from optic neuritis may be divided into several distinct groups. In some this disease is due to arachnitis, in some to cerebral tumours, and in others to blood poisoning. Several other less frequent causes might be mentioned, and under the term blood-poisoning we might probably instance several different kinds, *e.g.*, syphilis, the specific poisons of some other exanthems, and perhaps some minerals, such as lead.

My attention has for some time been drawn to a group of cases in which optic neuritis occurs in children, and in which the symptoms differ in some respects from what we usually find in others. Nearly always there is a history of a severe illness, which was supposed to be fever, and was marked by delirium and other head symptoms. As the child recovered from this it was found that blindness, either partial or complete, had occurred. Frequently such children regain good health, in fact recover perfectly, excepting as regards the sight. Hemiplegia, or any other form of paralysis, very rarely occurs, nor does the intellect suffer. There appears to be but little tendency to relapse. In these features we have much difference from what is usual in neuritis in adults.

These cases appear to me to be so peculiar, that I have thought it worth while (with the able assistance of Mr. Waren Tay) to collect those of which I have notes into the following table, in the hope of placing their features of resemblance and of difference in a clearer light.

In many instances, owing to the age of the patient, the ophthalmoscopic examination was made under difficulties, and was not so complete as could be wished. I

have noticed that in a few cases, not only is there evidence of neuritis, but also of peculiar changes at the yellow spot. Although there are rarely any indications of general retinitis, yet at the yellow spot itself there is sometimes seen a group of highly refractive globules, resembling at first glance a cluster of spider's eggs. These groups are almost symmetrical, and are very definite. I have not often seen anything resembling them in the eyes of adults. A case is published in an early volume of our Reports, with a coloured drawing, in which they are represented. Dr. Bader there describes them as looking like the vesicles of herpes, and the comparison is really apt. In that instance the subject was an adult man, who had become blind after an illness attended by vomiting, pain in the head, &c. The conditions were symmetrical, and there was no clue to any special cause.*

In a few of my cases the proof that neuritis had occurred is not positive, the patient having passed into the stage of advanced atrophy before coming under observation. Judging, however, from their close resemblance, both in history and in general features, to the other cases, I feel no doubt that a stage of neuritis had preceded the atrophy.

My cases appear to have special value as regards the prognosis of this disease, since in several of them I have been able to extend the history over some years.

I would venture to ask attention to the fact that cases of primary white atrophy, without head symptoms and without assignable cause, such cases as we so frequently meet with in adult men (tobacco amaurosis) are unknown in children. In almost all cases in children there is good reason to believe in neuritis as the first disease, and in the few which I have seen of primary atrophy, there was a clear history of syphilis.

* See Ophthalmic Hospital Reports, Vol. II, April, 1859, Plate viii, figs. *a*1 and *a*2.

TABULAR STATEMENT OF CASES OF OPTIC NEURITIS IN CHILDREN.

| No. | Name, Date, Reference, &c. | Age. | State of Health on Admission, &c. | History of Former Illness. | State of Vision of Pupils, &c. | Ophthalmoscopic Examination. | Remarks. |
|---|---|---|---|---|---|---|---|
| 1 | Julia Garner. p. 38 B. April 17, 1862. | 11 | Head thrown back. Cervical muscles rigid and somewhat tender on pressure. Her mother thought this had been always so. Tongue clean. The pains in the head (back and front) and neck had subsided, but had returned a few days before. | Very restless nights. Much headache. No history of diphtheria, or of any exanthem. No failure of power in arms or legs. She could see well till three months before, when she began to grope her way about. At night she had flashes of light. No muscæ. She lived in an ague district. For six weeks previously her sight had been much as on admission. | Pupils of moderate size; exceedingly sluggish; almost motionless. Left slightly larger than the other. Aspect decidedly amaurotic. Face pale; placid. She could just distinguish the large bars on the windows. The globes twitched, but there was no paralysis of any muscle. The eyelids, possibly, drooped a little. | Condition in both eyes very similar. Media quite clear. Optic discs not well defined, and of a grey pink tint (not white). In the left it was impossible to distinguish the margins of the optic disc at all. The arteries of retina were very small, but the veins very large. Extending from the optic disc in each eye towards the yellow spot was a large group of small brilliantly white patches. Some of them very small; others rather larger; all round or oval. They resembled the perforations of a worm eaten leaf or a group of butterfly's eggs. | She died in the Blind School, London, April, 1864, where she had been for a year. A month or two before her death I saw her. She was then in good health; quite happy; walked well. Venæ centrales large and conspicuous. Arteries small; discs very white. Pupils large and motionless. Divergent squint. Dr. Sharp informs me that she died with cerebral symptoms. |

TABULAR STATEMENT OF CASES OF OPTIC NEURITIS IN CHILDREN—*Continued.*

| No. | Name, Date, Reference, &c. | Age. | State of Health on Admission, &c. | History of Former Illness. | State of Vision of Pupils, &c. | Ophthalmoscopic Examination. | Remarks. |
|---|---|---|---|---|---|---|---|
| 2 | Susannah Burrows. p. 132 B. Sept. 15, 1863. | 10 | A stout, flabby, pale child. Could walk well. Pain and sickness had ceased six weeks before. She was cheerful. Hearing good. Slept well. She had no cough. Both parents living and healthy. | In April she had scarlet fever, and was very ill. Afterwards she had œdema of the legs (slight). The left eye was the first affected. In about three weeks she was quite blind. She had pain in her head (chiefly frontal), and vomited. She never had "fits." | Total inability to perceive light. Pupils large; of equal size, and almost motionless. The left globe looked outwards. Aspect amaurotic. | Conditions similar in both. Media perfectly clear. Optic nerves white (very); veins large; arteries very small; choroid orange-red, not markedly so. No other changes. | In this case the pain would often last several days and nights, and prevent her sleeping. The vomiting occurred once in two or three days; not at any particular time. No failure of muscular power. |
| 3 | Louisa Butler. p. 173 B. March 17, 1864. | 12 | A very pale, delicate - looking child of amaurotic aspect. Could walk well, and had power over sphincters. Never sick; no pain; cheerful; appetite good; could sleep well; was gaining flesh | Three months ago she had a severe illness, with most severe headache and vomiting. She was somewhat delirious, and would scream much. Dec. 10.—Admitted into St. Bartholomew's. Dec. 23.—Quite sensible, but motions passed involuntarily. Could not move head well. | When she left Bath she could see very fairly. She believed she could read small print. About a fortnight afterwards her sight failed rapidly, and in a fortnight she was quite blind. | Great difficulty in getting her to fix her eyes. Conditions almost perfectly similar in the two eyes. Optic disc swollen, elevated, greyish, and woolly looking. Veins tortuous; everywhere visible, but as if in a greyish semi-transparent substance. Arteries much diminished, | Detailed notes of her illness whilst in St. Bartholomew's have been kindly furnished to me by Mr. Glynn, Clinical Clerk to Dr. Jeaffreson. 1864. March 22.—Urine pale. Deposited lithic |

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| | | | rapidly ; she could move her head freely. | At time of discharge, Jan. 14, her motions and urine passed involuntarily, and she could not walk. She soon regained power. | Pupils widely dilated and fixed. Weakness of right int. rectus. | but still to be seen. No extravasations. | acid.<br>1866. Dec.–Inmate Blind School (Brighton). Quite blind, but in excellent health. |
| 4 | Robert Loamy. p. 178 B. January 15, 1866. | 1 yr. | The child was pale. The anterior fontanelle was open.<br>Feb. 23.—General health improved.<br>March 29. — In good health, and very cheerful. The anterior fontanelle still large, but the head not hydrocephalic.<br>June 4.—In good health. | Supposed to have been blind several months. The mother first suspected it three weeks ago. She considered that he could see well till he had "fits" in connection with teething. He was noticed to squint after the fits. He had four "fits," during which he turned quite stiff, and clenched his fists. He could always move his arms and legs. | Feb. 23.—Appeared to be blind.<br>March 29. — The mother thought that he did not see at all. His pupils were of moderate size, before the use of atropine, and dilated well with it. Aspect not amaurotic ; indeed, he appeared at times to be fixing objects ; but he did not appear to see in the least. | Discs grey-white, of a dirty colour ; the margins indistinct and blurred. Arteries small, veins rather large. The retina everywhere, except close to the disc, transparent and clear.<br>Feb. 23.—Much the same.<br>March 29.—Discs clearer, and not very pale. The retinal arteries small, but the veins of fair size. The margins of the discs tolerably distinct, and the atrophy not nearly sufficient to account for complete blindness. | A grain of iodide of potassium was ordered three times a-day. No syphilitic history obtainable.<br>June 4.—He can now certainly see. He will seize large objects held before him, but slowly. Expression of eyes decidedly vacant.<br>Dec. 17.—Can see much better. |
| 5 | Mary Chitty. p. 125 C. Dec. 6, 1866. | 6½ | Good. | The left had been failing since an attack of measles at age of twelve months. She had no fits. The right | | Both discs pale and indistinct. Right disc a little elevated, and trunks of vessels on its surface somewhat con- | |

TABULAR STATEMENT OF CASES OF OPTIC NEURITIS IN CHILDREN—*Continued.*

| No. | Name, Date, Reference, &c. | Age. | State of Health on Admission, &c. | History of Former Illness. | State of Vision of Pupils, &c. | Ophthalmoscopic Examination. | Remarks. |
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| | | | | had failed for a fortnight only. | | cealed. Left disc flat, and less lymph about it. Vessels (artery and vein) diminished very considerably. The left ones the smaller. Choroid pale, with minute dots of white in front of it, ill-defined, and occurring chiefly in a group near the yellow spot, but also at other parts. | |
| 6 | Charles Hoskins. May 28, 1866. p. 14 C. | 11½ | A pale thin lad, a ravenous eater, but always thin. His father attributed this to worms. He had very imperfect power in his legs; he could just walk without assistance, but he seemed as | Two months before he was in Guy's Hospital for a severe illness. His legs were paralysed, and he was insensible for some time. He had very little pain in his head. The first symptom noticed was that he squinted. This passed off as he began to lose the use of his legs. He | He could not appreciate even the flash of light from the ophthalmoscope. | Optic discs anæmic. Vena centralis somewhat larger than natural, and the arteria decidedly smaller, but minute twigs can still be traced on the disc. The apparent inner side whiter than the outer. In the right eye the edge of the disc very indistinct, and the disc | Admitted into the London in June. While in he had occasional sickness, and when discharged in July his sight was still the same. After his discharge he became liable to fits, in one of |

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| | | | if he would fall every minute. | had no convulsions. | | itself looked elevated and swollen. In the left eye the margins of the disc were much more abrupt. | which he died on Nov. 27. No autopsy. |
| 7 | Charles S. Wood. p. 16 C. Jun 4, 1866. | 11 | A sturdy, healthy looking boy, quite cheerful; could walk well. His father considered that he had been a "weakly child." He complained of pain in the back of his neck. | When 14 months old he had "inflammation in the lungs, and was insensible." He got quite well. His sight was first noticed to fail three months after an attack of small pox. In September his father noticed that he did not write straight, and then he found that the boy could not see well. He had not complained of pain in his head. | He could only read No. 14 (Jaeger) at three inches; he could not make out anything at a distance; not improved by glasses. Sept. 24.—The father considered that his sight was improving; he could write a little on a slate. | Discs of a dirty white colour, the vessels on them of fair size, but somewhat obscured, and the edges of the disc a little irregular. Oct. 22.—Discs very clear; atrophy of nerve, very decided pallor, and some cupping; vessels of fair size. | On October 22 his sight was as at first note. Dec., 1866.—Much the same. |
| 8 | Wm. Fisher. p. 19 C. May 28, 1866. | 13 | He could walk quite well; when told there was nothing in the way he walked boldly. | History of fits and "dreadful pain in his head" in February. Was admitted into St. Thomas's Hospital (Dr. Bristowe) in March. At this time his mother said the right eye looked larger than the other. In the hospital | Both pupils motionless, the right being twice the size of the left. No perception of light from the ophthalmoscopic mirror. | In both the optic discs were dirty and fluffy, the margins being concealed; the arteria centralis much diminished in size, and the vessels on the disc being concealed at parts by the deposit of lymph. In both the | |

TABULAR STATEMENT OF CASES OF OPTIC NEURITIS IN CHILDREN—*Continued.*

| No. | Name, Date, Reference, &c. | Age. | State of Health on Admission, &c. | History of Former Illness. | State of Vision of Pupils, &c. | Ophthalmoscopic Examination. | Remarks. |
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| | | | | he got much worse, and was expected to die. When he was discharged he could not walk; he did not seem to have any use in his legs. She considered that he could see until the end of April. | | appearances of neuritis were passing off, but the right was further advanced in atrophy than the left. | |
| 9 | William Henry Fowler p. 35 C. June 25, 1866. | 7 | He had been taking cod-liver oil, and was in better health than he had been for some time. There were scars of old strumous disease about his right carpus. He could walk quite well, and was very cheerful. Aug. 20.—He was in good health; every sense be- | Rather more than twelve months previously he had what the father called "sore-throat fever." He was insensible for a fortnight or three weeks; he lay on the bed not knowing anybody. He went to school afterwards, and his sight was not noticed to be defective at all. Sixteen weeks before admission his right failed suddenly. His father | For sixteen weeks he had seen daylight occasionally, but more often he could not; his pupils were equal, and acted fairly, but never contracted to small size. | Conditions symmetrical in the two eyes. Media clear. The optic discs had a definite outline, easily seen, and almost round. They were pale, and uniformly so. The vessels were diminished in size considerably. On the disc itself, although the trunks of the vessels were easily seen, they did not appear to have that distinctness of outline which is common in mere atrophy. I think | He was ordered a grain of iodide of potassium three times a day. |

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| | | | lieved to be perfect excepting sight. | considered that he could see quite well one night, and the next morning when he got up he could not see his way about. "He had to feel for things." The week before he lost his sight he complained of pain in his head, but ran about as usual. | | there must have been a stage of neuritis. At the yellow spot in each eye there were a series of small white patches, streaks and dots, some of them perfectly round. It is difficult to say whether these were from deposit or atrophy. | As he was quite blind, the examination was made under some difficulties. This condition of the yellow spot in each eye exactly resembles what I have several times before seen in neuritis in children, and very rarely in adults. During the illness mentioned above he had convulsions, and his hands were bent on the fore-arms. |
| 10 | Anne Rolf. p. 10 C. May 7, 1866. | 40 | | "Water on the head," "fits," often fell down stairs in childhood. She stated that she was blind of both eyes for a month, but that then the right improved. The left continued blind. | Could not see to do needlework, but could see large print. She said — 3½ made things look brighter, but there was no definite improvement. | White atrophy of optic dises. Artery and vein (central) in each eye easily seen. No things on the disc could be distinguished. Left more advanced than right. Discs looked small and irregular, the left especially so. In the left eye there | This case is introduced as showing (probably) the state of things long after neuritis (optic) in childhood. |

TABULAR STEATEMENT OF CASS OF OPTIC NEURITIS IN CHILDREN—*Continued.*

| No. | Name, Date, Reference, &c. | Age. | State of Health on Admission, &c. | History of Former Illness. | State of Vision of Pupils, &c. | Ophthalmoscopic Examination. | Remarks. |
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| | | | | | | were patches of absorbed choroid, with deposit of pigment. | |
| 11 | Henry Bayliss. p. 40 C. June 28, 1866. | 7 | Intelligent, active, fond of swinging, &c. Always "running about and playing." Taste said to be good. Smell very defective. Probably he cannot smell at all. | In 1863 he caught cold, and was taken ill with pains in neck shoulders, elbows. His mother could not keep him in bed; "he was almost mad." He was confined to bed for nearly three months, and every now and then had "fits." He always knew his mother. He never lost the use of his limbs, but when he began to get about he would stagger and fall down sometimes. It was then noticed that he could not "find things." | Pupils large and fixed. Globes divergent and twitching. He said he saw light for the first time for two years a few days before admission. | | There was no clue to any syphilitic taint. Dec., 1866.—Much the same. |

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| | | | | Six months after the commencement of the illness he was quite blind. | | | |
| 12 | Charlotte Thompson. p. 73 C. Oct. 1, 1866. | 7 | Fair complexion, red hair, large head, thick alæ nasi. Could walk well, was cheerful, but nervous. Forehead prominent (like her mother's). Quite intelligent, mother considered that her head was injured by use of forceps. | The illness commenced on New Year's Day, 1866. Pains in limbs, sickness, convulsions, loss of speech for an hour or two at a time while recovering from the convulsions, delirium at times, complete paralysis of legs, and for long while inability to bend her back, stiffness and pain in neck. Always passed motions &c., consciously. At end of five weeks she began to get about again, and it was then noticed that the eyes were crossed. She was supposed to see well. Her hair all came off. In a week or ten days the left eye was found to be failing. In a month (March) the right eye failed also. | Large sluggish pupils. Could distinguish daylight, fire-light, candle-light, &c. | White discs (dirty white), abruptly margined. No disease at yellow spots. The larger veins and arteries somewhat diminished in size. | A grain of iodide of potassium was ordered three times a day. She is now in good health, but quite blind, and her mother is endeavouring to get her admitted into a blind school. (Dec. 4, 1866). |

## TWO CASES OF CYSTICERCUS IN THE EYE.

By T. Pridgin Teale, Junr., M.A., Oxon,

*Surgeon to the General Infirmary at Leeds.*

Although several instances of cysticercus in the eye have been already brought before the profession, the two following cases appear to me to be of sufficient importance and interest to justify me in recording them:—

### Case I.—*Cysticercus in the Vitreous Humour.*

Martha Colbeck, of Batley, æt. 45, consulted me at the General Infirmary in the latter part of 1864. She complained of weakness of sight of recent occurrence affecting both eyes. She did not direct my attention to one eye more than the other. As she had a convergent squint, involving especially the right eye, I examined the eye carefully, and found the sight deficient. She then told me that she had squinted since infancy, that the vision of the right eye had been defective since childhood, and that this deficiency had not materially increased. The eye had never been inflamed nor painful.

On examination, I found that with the right eye she could, with difficulty, read 8 Jäeger, and that the field of vision was imperfect, but could not be mapped out in consequence of her inability to fix the eye steadily. Iris active, and equal in colour to the left. Aqueous clear. Tension normal.

*Examination by Ophthalmoscope.*—About the centre of the posterior surface of the lens there is a brilliant white spot, which is prolonged backwards into the vitreous by a dull, grey neck, which then rapidly swells out into a balloon-shaped body. The body is semi-opaque, bluish, slightly corrugated, and of such a size, that only about one-third can be seen in the field at one time. It recedes from the centre of the lens towards the nasal side. The vitreous is clear, and the natural reflection of the choroid is visible at the temporal side of the opaque body. By "oblique

illumination" the brilliant white head of the cysticercus can be seen at the back of the lens, the body being undistinguishable.

As the patient was not able to keep the eye steady it was impossible to ascertain whether any variations of shape of the animal took place, or whether there were any signs of vitality.

This patient was first seen in 1864; again in October, 1865; and, lastly, June 16, 1866.

During this period of two years no change has taken place in the appearance of the eye, or of the animal. The sight has slightly deteriorated, but the eye does not appear to suffer in any visible degree from the presence of the entozoon.

Two questions of considerable interest may now be raised. First, how long has the cysticercus been a tenant of the vitreous humour?

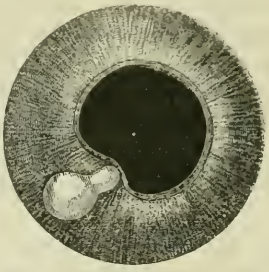
Since infancy there has been strabismus, and since childhood a defect of vision, which has continued till the present time with but little variation. There is no history of inflammatory disturbance which would point to the period of the invasion of the animal. Are we, then, justified in suspecting that the original defect of sight and the strabismus may have been caused by the presence of a cysticercus, and that the cysticercus has been in the eye almost from birth?

The second question is, whether removal of the animal is possible, and, if possible, whether it is desirable to make the attempt.

It seemed to me that it would be possible to introduce the suction-curette through a small opening in the sclerotica into the vitreous humour, and, whilst observing the movements of the instrument by the ophthalmoscope, to plunge the point of the curette into the body of the cysticercus and remove the fluid contents by suction. The body of the animal might then perhaps have been partially withdrawn by means of the curette, or left as a shrivelled membrane. Before deciding on any operation I wrote a description of the case to Mr. Bowman, asking his opinion; he replied, "Gräfe says your cysticercus is probably in the vitreous canal, and comparatively harmless from its fixity. Therefore he would not touch it, as it is of great risk of loss of eye." In accordance with this opinion I have refrained from any operation, and content myself with a periodical examination of the case.

Case II.—*Cysticercus on the Iris.*

Mary Isabel Bateman, æt. 10, living at Armley, was brought to me on June 2nd in consequence of tenderness of the right eye. On examining the eye there was seen (vide drawing), on



*Pen-and-Ink Sketch* (*enlarged*), *showing the position and shape of the Parasite.*

the surface of the lower part of the iris, an opaque body, constricted in the middle, and rather larger than an hemp seed, which was evidently causing some distress to the eye. The conjunctiva was slightly injected, the cornea was bright, but dotted on its posterior surface with minute spots, as in corneo-iritis; the iris was active except at the situations of the white body, near which it was adherent to the capsule of the lens. Tension normal. Reading No. 16 Jäeger. Her mother gave the following history of the white body :—

For two or three years the eye had been occasionally inflamed. Six weeks ago she first noticed a speck on the iris of the size of a pin's head. Two weeks later, the speck having grown larger, she consulted Dr. Hepworth, of Armley, who detected a bladder-like body, which he supposed to be a cysticercus. At the end of five weeks the spec was doubled in size, and had become constricted in the middle, after which the eye became dim and painful. On further inquiry I found that the child had always been delicate, and had long suffered from thread-worms, but not from tape-worm, or any other kind of worm. In August of last year she was attended by Mr. Scattergood in a severe attack of scarlet fever, with albuminuria and head affection, during which she had convulsions for two or three days followed by strabismus,

which afterwards disappeared. Since that time the right eye had been tender, and the right arm weak.

June 9.—An incision having been made at the margin of the cornea with a cataract knife, the piece of iris on which the animal was fixed was withdrawn, and cut off without destroying the cysticercus. When removed from the eye the slow movements of the body and changes of shape were easily detected. Examined by the microscope, the head and neck surmounted by the circle of hooklets, and four suckers were seen to project from the side of the body. (The rough sketch below.)

June 12.—The eye has been more comfortable since the operation, is free from pain, and the dots of lymph have disappeared from the posterior surface of the cornea.

14th.—The eye is free from redness and irritation except at the wound. Reads 16.

23rd.—Reads 16.

November 3rd.—Reads No. 1.

In selecting iridectomy in the treatment of this case in preference to any attempt to remove the cysticercus alone, I considered that two advantages would be secured. In the first place, iridectomy would accelerate the restoration to health of structures suffering from the presence of the cysticercus; and in the second place we should thereby avoid the almost certain prolapse of the iris; a complication by no means trivial in an eye already deviating from a healthy state.

## NOTES OF TWO CASES OF COLOBOMA, AND ALSO OF THE DISSECTION OF AN EYEBALL AFFECTED WITH POSTERIOR STAPHYLOMA.

By Spencer Watson, F.R.C.S., Eng.,

*Two Cases of Coloboma of the Iris, associated with corresponding deficiency in the Ocular Tunics.*

Case I.—Mrs. L., æt. 30, married, applied at King's College Hospital on July 13, 1863. She had a nearly symmetrical deficiency in both irides at the lower and inner side. Her field of vision was curtailed above, but she was quite able to work with her needle. Under oblique illumination the pupils were observed to have a thin film over them, and the pupillary margin was noticed to be irregular and fringed with pigment at several points. The ophthalmoscope shewed a bluish white surface extending from near the cleft in the iris to within a short distance of the optic disc, which latter was normal in appearance, and separated from the colcboma by a narrow bridge of healthy choroidal tissue. Sclerotic vessels distinctly ramified on the white patch, and irregular islets of choroidal pigment were scattered along the edges of this latter. Both the eyes presented very similar appearances. She herself was an otherwise well formed woman, and she had several children, who were all free from any ocular defect.

Case II.—In October, 1866, a girl, æt. 18 years, came to the Central London Ophthalmic Hospital with her brother, who had a very extreme convergent strabismus. She was healthy and otherwise well formed, but had a deficiency in the lower part of each iris; that in the right eye being much smaller than that in the left. She stated that another brother had been operated on for squint, and that all her family had some ocular defect.* The right eye was very amblyopic, and only slightly improved by concave glasses. The left eye was decidedly improved by $-\frac{1}{20}$ for distance, and with this eye she was in the habit of working and reading, though with some difficulty. In both the field of vision was limited above. With the ophthalmoscope a white membrane was seen quite bare of choroid or retina, extending from the cleft in the iris quite up to the optic nerve in each eye.

* The brother has since been brought to the hospital, and he has coloboma of one eye.

The white tract was sharply margined by the choroid, and no bridge of this latter coat or of the retina intervened between it and the optic disc.

*Dissection of an Eyeball affected with Posterior Staphyloma, in which some peculiar appearances were observed.*

The eyeball was removed by Mr. Bowman on October 30, 1866, from a man 25 years old. It had been blind from early infancy, and exhibited the following appearances. Nearly the whole cornea was leucomatous, and there was total anterior synechia. The globe was much elongated in the antero-posterior axis, and with backward extension of the posterior pole, the optic nerve had been pushed very much inwards. A section of the fresh eyeball was first made through the equatorial region, and the interior of the posterior segment was inspected through the vitreous. At the nasal side of the optic disc, which was small and white, and slightly excavated, a white, woolly-looking oval body, about 2‴ in its long, and $1\frac{1}{2}$‴ in its short diameter, was seen partly projecting into the vitreous humour. In a section made through this woolly body, after the globe had been hardened by immersion in spirits of wine, the nerve sheath was seen to be thickened at the nasal side, and the white body appeared as a membrane lying upon and co-extensive with the thickened sheath. The sclerotic at the posterior pole was thinned. Examined with a $\frac{1}{5}$-object glass, the white membrane exhibited successive layers of fine and large granular cells, having some resemblance to those of the normal retina. Where the opaque membrane was continuous with the retina, these layers ceased abruptly. No nerve fibres were seen with this power.

The close resemblance which this white woolly membrane, seen through the vitreous humour in the fresh state, bore to the appearances presented in cases of neuritis of the optic nerve, suggested the idea that some of these may possibly be pathologically allied to this case, which I am disposed to regard as an instance of thickening of a wasted retina, proceeding from chronic inflammation, transmitted to it from the subjacent sclerotic.

## NOTES OF MISCELLANEOUS CASES.

By Jonathan Hutchinson, F.R.C.S.

(Continued from page 222.)

### No. VII.—*Choroido-retinitis in Two Sisters, ending in Blindness in one of them at the age of* 17.—*Infantile Paralysis in the other.*

The two following cases are interesting in reference to the obscurity of the cause to which the choroido-retinitis was due. Although no history could be obtained, I yet suspect in the absence of other explanation, that there must have been a taint of syphilis. A few weeks ago, at one of our evening demonstrations, Mr. Streatfeild brought forward a girl with well-marked choroido-retinitis, whose central incisors were most typically notched.

Ellen White, æt. 17, an ill-developed, sleepy-looking girl, attended in the beginning of October, 1866. The history we obtained was that at school, when quite a child, it was noticed that she could see better at a long than at a short distance, but at 12 years of age she began to squint (convergent). Her mother took her to Guy's Hospital. The squint was operated on, and she was told she must wear spectacles. After the operation, for a time she was annoyed with double vision; this, however, passed off, and it was considered that she was much benefited; but before very long her sight began to fail, with occasional pain around the orbit, and inability to see at night, or in a dull light. She had no muscæ nor flashes of light. Her sight slowly got worse, until she became, as she is at present, quite blind. She had menstruated three times only.

Her mother had borne twelve children, ten of whom died in infancy. An elder sister (living) and our patient made up the number. The mother said that she and her husband were not related before marriage. No history of symptoms suspicious of syphilis (excepting the infantile mortality) was obtainable. The father had died after a long illness, attended by paralysis.

*Ophthalmoscopic Examination.*—The eyelids were half closed;

there was slight divergence of the left eye, and the pupils were of medium size, and quite motionless. The two eyes presented the same features. The discs were of a dirty grey white, and the vessels so small that they could only be traced with difficulty beyond the margin. There were but few denuded patches of sclerotic. The pigment was accumulated in "blots" rather than stellate patches. There were a great number of these "blots," and more of them near the centre than at the periphery. Many of the pigment patches were in the retina itself.

Her elder sister, Catherine (æt. 19), also came. She was the subject of infantile paralysis. Her sight had been failing for twelve years, and her eyes were in much the same condition as her sisters', but less advanced. She can still see large letters.

No. VIII.—*Slowly Progressive Blindness from the age of* 9 *years.—Retinitis Pigmentosa with the accumulations most abundant near to the disc.—Extreme shrinking of Retinal Vessels.*

The following case presents some features of similarity to the preceding one. In both the optic disc was atrophic, and the central vessels shrunk to extreme minuteness. In both the accumulation of pigment in the retina was very great, and chiefly near to the disc and yellow spot, not as usually observed in retinitis pigmentosa, most abundant at the periphery. In both the progress of the disease had been very gradual, and without assignable cause, and had gone on to complete blindness. In neither were any other indications of nervous disease to be discovered.

H. B., a moderately stout, intelligent man, æt. 52. He believes that he was quite healthy in early life, excepting that at the age of 4 years he had convulsions during measles. In childhood he learnt to read. At about the age of 9 he began to lose his sight. At the age of 11 he went to sea, but as he "could not see the masthead," they refused to take him as an apprentice. He returned home in nine months, suffering from scurvy, and his sight was very much worse, but he could still see to read a little. At the age of 13 he ceased to be able to read. He now got occupation as a groom, and subsequently as a driver, being obliged to give up first one and then the other, as his sight gradually

failed. In 1841 he was at length obliged to give up all work, and has done none ever since. Up to two years ago he could just see to get about the street without using a stick. At present he has only the barest perception of a strong light. His aspect is that usually considered characteristic of amaurosis.

The irides are lustrous, the pupils larger than natural, but acting very fairly when exposed to the light.

It will be seen that the loss of sight has been very gradual indeed, its course extending over forty-one years.

He is not aware that any of his relations have had their sight affected, excepting a sister, who had her sight temporarily disturbed while working in scarlet cloth. His hearing is good, his smell is good, memory tolerable. There are no indications of general mischief to his nervous system. He is liable to pain across the eyebrows, but never in the eyes themselves. He has been a great smoker, but did not smoke before his eyes began to fail.

April, 1863. *Ophthalmoscopic Examination.*—The media are perfectly clear in both. The optic discs are of a dirty grey colour, and in both the vessels are reduced to the most extreme degree of minuteness. In each I can trace only one having an exceedingly small branch upwards and one downwards, probably veins. Although the choroids are very pale, their structure is not at any part absolutely wanting. There are no patches of exposed sclerotic. The branches of the Vasæ Vorticosæ in many parts are beautifully seen. The pigment is chiefly collected in the parts surrounding the optic disc and yellow spot, and becomes much less abundant at the periphery. Thus when he fixes the eye for inspection of the optic disc, at first sight the fundus appears almost black, so numerous are the pigment masses. Most of the latter are clearly in front of the choroid.

No. IX.—*A Child Born with one Eye deficient and the other shrunken.*

A baby, aged five weeks, was brought by her mother, Mrs. Hazlett, Oct. 11, 1866.

This was her sixth child, and the others were reported to be healthy. In the tenth week of her pregnancy she had a severe fright, being suddenly called into a room were a neighbour was dying. "The occurrence made her turn cold, and she did not

get warm again the whole day. The child was born at full time, but was very puny. All her others were fine ones." On examination we found that the child was exceedingly puny, and unable to make any noise in crying. There was some degree of talipes calcaneus of the right foot. It kept its fingers and thumbs constantly bent into the palms. Its head was of due size in proportion to its body. Its physiognomy was rendered peculiar by a deep furrow, which could be felt with the finger, crossing both orbits and the bridge of the nose from canthus to canthus. There was also a notch in the bony margin at the outer side of each orbit. The eyeballs were shrunken to a very small size. The palpebral apertures were very narrow, but the lids were perfect. The child shed tears when it cried. In the right orbit no trace of eyeball could be discovered. In the left orbit the bulb of the collapsed globe was distinguished by the remains of a small portion of cornea with a scar on it, and a tag of adherent iris looking exactly like the state of things after sloughing from purulent ophthalmia.

This child died a few weeks after these notes were taken. Dr. Gray, of Poplar, who made a post mortem, informs me that in the right orbit no trace of the eyeball could be found.

### No. X.—*A Child Born with Shrunken Eyeballs.*

The subject of this case was shown me by my friend Mr. Mundie, of Richmond Road, who had attended the mother in her confinement.

The child presented a close parallel to what is described in the case above. The collapsed globes are so small, that they are with difficulty discovered. The child is living and healthy. Its head is well formed, and the furrow crossing the orbits described above is not present.

### No. XI.—*On Excision of the Eyeball in the Acute Stage of Traumatic Pan-ophthalmitis.*

As an opinion is, I believe, held by some high authorities that the excision of globes when acutely inflamed is dangerous, I think it desirable to record the fact that during the last year I have performed numerous such

operations without the slightest ill result. Whenever I am satisfied that an injured globe is utterly lost, I always advise its excision without loss of time. By adopting this course the patient's suffering, often extreme, is at once put an end to, and I think, also, the risk of sympathetic inflammation of the other eye is avoided. I have excised globes in all stages of inflammation, and have never seen the slightest ill consequence, whilst the patients have invariably been most grateful for the complete relief afforded. The hæmorrhage is usully rather more than when the cellular tissue is not infiltrated, and the operation is much less easy of performance (especially when the globe is in a state of proptosis from inflammation), but these are objections of very minor consequence. In a recent case of peracute inflammation after a blow, in a poor girl of 18, the globe was pushed out of the orbit by swelling, the lids partially everted, and the conjunctiva chemosed. In this case, owing to the matting together of the tissues, and the soft, flabby state of the sclerotic, I had more difficulty in the excision than I could have believed possible. Although, after the removal of the globe, the lids were still left tense, dusky, and prominent from swelling, yet the most complete relief was given, and the patient, who had been worn out by ten days and nights' incessant suffering, was looking quite happy on the following day.

A month ago I excised an eyeball on account of traumatic ophthalmitis within forty-eight hours of the accident —by much the shortest period within which I have ever felt justified in advising the operation.* A lad of 14 was going through the street one Saturday evening, and stopping to watch a man shooting on a nut-stall, the cap flew, and a fragment entered his eye. Severe pain commenced at

* This statement, of course, applies only to removals on account of the inflammation, and not for the direct effects of the injury. Where the eyeball was hopelessly destroyed by laceration, I have sometimes removed its remains immediately.

once. He came to me on the Monday morning with a small hypopyon, the posterior lamina of the cornea dotted over with small accumulations of puro-lymph, acute iritis, and opaque vitreous. He had no perception of light. Mr. Dixon and Mr. Streatfeild both saw him with me, and both agreed in the opinion that, although the cornea was still almost clear, there could be no doubt that the organ was lost. The lad willingly consented to its removal, so great had been his suffering. After excision I found a portion of gun-cap behind the ciliary processes, the whole region of which was covered by puro-lymph in a coherent membrane. The vitreous was still, for the most part, translucent; but in various parts of its substance films of yellow lymph were visible. There was also lymph on the surface of the retina at almost all parts. At so early a stage of the inflammatory process, in such a structure, microscopic examination would have been most interesting, but I was compelled, by the pressure of engagements, to let the opportunity slip.

No. XII.—*Operations for Solution of Senile Cataracts commenced at an early period without allowing the Cataract to ripen.*

In a future number of our Journal I propose to give a detailed report of a series of cases in which I am now trying needle operations for senile cataracts. My plan is: 1st. To commence the treatment as soon as the opacity is advanced sufficiently to cause serious inconvenience to sight, and thus before the lens has become very hard; 2nd. To do very little each time, and to do that little very carefully, so as to avoid any displacement of the lens; 3rd. To allow a long interval between the operations; and 4th. To use atropine very thoroughly. In the cases now under treatment, eight in number, I have, as yet, had no drawback whatever. In all, solution is steadily proceeding. The patients have none of them been confined to the house, and

none have suffered any material pain. Even if in some it may prove needful to use a spoon to extract the nucleus, still I anticipate advantage from having got rid of the cortical substance beforehand.

No. XIII.—*Acute Glaucoma Supervening in an Eye previously lost by Retinitis from Renal Disease.*

Mrs. S., æt. 45, came to me suffering most severely from acute glaucoma in her left eye. The cornea was so steamy, and the media and lens so hazy, that it was impossible to inspect the fundus. The globe was very hard, and there was much venous congestion. As she told me that the eye had been blind for some weeks before the pain began, I had no hesitation in advising excision instead of iridectomy. In giving this advice I had also in view the possibility that a malignant growth might be present. She had scarcely slept for a week, and was worn out with pain. She had previously been under the care of another surgeon, who, after examining the eye, had requested a specimen of her urine, and by whom she had been sent to Hastings for the improvement of her general health.

I excised the globe, and found on dissecting it that the retina was greatly thickened by white fatty deposit in the region of the yellow spot, where also were numerous apoplexies. Her pain was completely relieved by the operation, and she soon regained her health. Her other eye is, as yet, perfect.

Her urine does not now contain albumen, but she has suffered from the kind of dyspeptic symptoms which are very common in cases of granular kidney.

No. XIV.—*Note on a Case of Double Glaucoma Six Years after the Attack.*

The following case illustrates the ultimate result of glaucoma under its two aspects: first, when let alone, and secondly, when arrested by operation. Facts as to the state which eyes that have been saved by iridectomy maintain many years afterwards are especially valuable.

Mrs. H., of Norwich, came under my care in July of the

present year on account of recurrent pain in the right eyeball. It had been lost by glaucoma six or seven years before, and presented now all the usual conditions. The globe was very hard, its surface dusky, and crossed by large veins; the ciliary region was much congested, and there was a dense secondary cataract. She had often suffered severe pain in and around it, and I advised extirpation as the only resource.

Her left eye had, she told me, been attacked by similar symptoms six years ago, and had been saved by a timely operation (iridectomy), performed by Mr. Critchett. At the date of this operation the right eye was already in so hopeless a condition that nothing was attempted on it. With her left eye she has ever since the operation enjoyed excellent sight, and she can now read small print easily for an hour together. Its tension and general aspect are normal.

I removed the lost eyeball, and afterwards made a hasty dissection of it. The vitreous was quite clear, and unusually firm. The iris was atrophied and very thin. The optic disc was deeply cupped and quite white. No trace of arteria or vena centralis was visible. Several small patches of extravasated blood were seen in the choroid, but there were none in the retina. I had not leisure to make a microscopic examination.

No. XV.—*Herpes Zoster of the Supra-orbital Nerve—Mild course, no inflammation of the Eye.*

I give the following case as an addition to my paper at page 194. It is the mildest case of frontal herpes that I have ever seen, though quite definite in character. The vesicles occurred only on the forehead, scalp and upper lid, only the supra-orbital territory being involved. The case supports my assertion, that unless the side of the nose shows vesicles the eye does not inflame.

Marianne Parker, æt. 14, strumous-looking, with thick lips, &c., was admitted November 19, 1866, with a scanty herpetic eruption on the left forehead, &c. Six days before she had felt pain in the left forehead and side of head. Three days later a rash had appeared on her forehead. There was then a small transverse group of herpetic vesicles on the upper eyelid, another on the inner part of the eyebrow, and a third on the side of the

head. There were none on the bridge or side or tip of the nose. Both eyelids were a little œdematous. There was no inflammation of the eye. The vesicles quickly dried up, but scars were left. A certain amount of irritability of the eye and intolerance of exposure to light attended the attack, and even remained for a time afterwards, but there was never any congestion whatever.

No. XVI.—*Shingles on the region of the left Frontal Nerve—No vesicles on the Nose, and no inflammation of the Eye.*

Mr. Paget has kindly sent to me the subjoined notes of another case of Frontal Zoster. They are from the pen of Mr. Ransome, of Bowden, Cheshire, by whom the patient was seen. We have in it another fact favouring the opinion that when the frontal region only is affected, the eye does not suffer materially.

A. B., æt. 43, head of a large firm in Manchester, generally enjoys good health, but subject to occasional attacks of dyspepsia, and ulcerated sore throat.

During last summer, after a period of hard work and anxiety, feeling languid and unfit for business, he was ordered to the seaside, whither he went at the beginning of September. Shortly after arriving there he experienced considerable "shooting" neuralgic pain over the left eyebrow, extending over the left side of the head. Some days afterwards several herpetic pustules appeared—one immediately over the supraorbital foramen—the others spreading in two chief lines, the inner one nearly vertical and extending nearly half way over the scalp, the other diverging across the left temporal region. One or two large pustules also appeared on the outer part of the left upper eyelid.

His medical attendant applied a strong solution of nitrate of silver and chloroform to the spots, and the following day severe erysipelatous inflammation set in and extended to the right side of the head, closing both eyes. There was also considerable suppuration from the spots. In a few days this subsided, no fresh pustules appeared, scabs formed over them, and gradually scaled off, leaving deep scars, like the pits from confluent small-pox. During and after the attack he was very weak and much depressed in spirits.

No. XVII.—*Inflammations of the Eye occurring some little time after Small-pox.*

Inflammations of the eye not unfrequently occur in patients who have suffered from small-pox, but who are quite convalescent before the eye is attacked. Mr. Marson, in his excellent report on this subject, of which I have given a summary at another page, makes but vague mention of this class of cases. They are indeed scarcely likely to come under the observation of the medical officers of the Small-pox Hospital, since their peculiarity is that they do not occur until the patient is well. At the Ophthalmic Hospital we not unfrequently admit cases of this kind. The eye having been attacked at a period varying from three to six weeks after the outbreak of the exanthem, a central ulcer of the cornea is the most common condition, and I have rarely seen both eyes affected, the ulcer frequently spreads rather widely, but not deeply. It is exceedingly intractable. There does not appear to me to be any good reason for alleging that these cases are merely scrofulous ophthalmia brought into action by the debilitating influence of a severe disease. Sometimes it occurs in delicate children, but half the cases I have seen were in adults of good health and who had never shown any indications of scrofula; nor could the keratitis be regarded as the direct result of debility, for the patients had regained appetite and a fair amount of strength, as proved by the fact that they were attending as out-patients, and in the habit of walking considerable distances. Tonics do not appear to assert any material good, or, at any rate, not quickly, and change of air has in one or two instances been the only influence under which benefit was obtained. A mild form of iritis also sometimes occurs as a sequela of small-pox. I have seen three or four instances of this, in two, at least, of which there was no inflammation of the cornea. I do not ever recollect to have seen both eyes affected.

Dr. Mackenzie mentions iritis as a not unfrequent combination of post-variolous keratitis when it occurs in adults; but he speaks of it as usually occurring about the twelfth day. That is, at the date at which the severe ulcerations of the cornea with hypopyon, &c., are usually observed. The cases to which I

refer were examples of almost pure iritis, and some of them were at much later periods.

No. XVIII.—*Notes on an Epidemic of Ophthalmia in a Pauper School.*

In November last I was requested by the Shoreditch Board of Guardians to visit their school at Brentwood, and report upon a form of ophthalmia which has prevailed more or less amongst the children for six years past.

In my visits I received every assistance from Mr. Butler, of Brentwood, the very able surgeon under whose medical charge the institution is. The school is a newly erected building in a very healthy situation, and well cared for in every respect. The diet of the children appeared to be good, and most of them bore the aspect of excellent health. The school contains 310 children, of whom about a third are under nine years of age. The dormitories, &c., are undoubtedly too crowded, and this necessitates the opening of windows and the risk of draughts.

Mr. Butler informed me that when the school came to Brentwood, in 1854, some of the children were suffering from ophthalmia, and that they had never been rid of the disease since. Six years ago a very severe epidemic prevailed. During the last four years it has been comparatively limited until the present summer, when it began to prevail about the middle of May. It had usually been worse during the summer and winter months. When epidemics had occurred they had almost all commenced suddenly. The boys had usually suffered more than the girls. During the present summer many of the "infants" (under seven years of age) had had it. I examined all the children, of whom about a third had inflamed eyes. The inflammation was of the chronic catarrhal form. In a few cases the lids were granular, but in none could I detect any evidence of enlargement of conjunctival glands ("sago-grains"). In a very few cases, probably not connected with this epidemic, ulcerations on the cornea had occurred. In no instance that came under my notice had the disease passed into a severe type of purulent ophthalmia. In no case had the eye been lost, nor did there appear to be any danger of material damage in any under treatment.

It appeared clear to me that the ophthalmia was a mild form

of contagious or catarrhal conjunctivitis, and I inclined to attribute its spread entirely to contagion. As compared with large numbers of the children of the poor living in their own homes these children had certainly great advantages both as regards diet, clothing, and ventilation.

The only peculiarity of which I could take hold, was the fact that so large a number were brought under one roof, and hence the facilities for the spreading of a contagious malady. A single child coming new to the school suffering from catarrhal ophthalmia might become the focus for the infection of most of his companions. Mr. Butler agreed with me in the belief that this had frequently occurred, and said that it was not uncommon for children to be sent up from London while suffering from sore eyes. The fact that the ophthalmia had prevailed sometimes in one part of the school, sometimes in another (boys, girls, and infants), favoured the belief that the disease spread by contagion, and contagion only.

Acting upon this opinion as to the real nature of the disease, I strongly recommended that increased hospital accommodation should be obtained so as to allow of the complete isolation of those affected until quite recovered. This seemed to be the chief measure. In addition to it we of course continued the local measures of treatment, which had hitherto been found very fairly successful, suggesting only some very slight alterations as regards the strength of the solutions used.

## 1. A CASE OF EPITHELIAL CANCER OF THE ORBIT.

By J. W. Hulke.

The deceptive resemblance of the external swelling to that of a carbuncle, the rapid growth of the cancer, its close sequence on a violent blow, and the safety with which the chloride of zinc paste was used for the purpose of destroying any portions of the morbid tissue which might have escaped removal by cutting, make the following case of orbital tumour one of the most instructive and interesting which I have seen:—

A railway porter, æt. 42, struck his left cheek against the buffer of a carriage, and three days afterwards it became black as if bruised. Three weeks after this the cheek swelled, and the eye began to water, and in two or three days more the swelling spread to the eyelids. About this time there was bleeding from the left nostril, which has occurred occasionally ever since.

February 14th. Six weeks after the date of the injury he became an out-patient at the Royal London Ophthalmic Hospital, under my colleague, Mr. Wordsworth. At that time the lower eyelid and the skin at the inner canthus were distended, red and shining, and the eyeball was slightly displaced forwards, and to the temporal side of the orbit. Mr. Wordsworth, thinking there was an abscess, made an incision, but no pus escaped from it; and a week later he again deeply punctured the swelling with a narrow knife, with a similar negative result.

A few days after this I first saw the patient. Now the lower eyelid, especially at its centre and inner end, was very much swollen; the hollow between the eye and the nose was filled up by a prominent dusky-red swelling, dotted with small yellowish points, which had the appearance of pus, but when cut were found to contain a soft gelatinous substance. The eyeball was thrown considerably forwards, upwards, and to the temporal side, and its movements were much restricted.

The conjunctiva was red and œdematous, and filmed over with mucus. The caruncle, in the form of a large flattened tumour, protruded between the eyelids. The cornea was bright. V. = No. 19, J. at 8″. The swelling and hardness of the tissues ceased with a definite margin above, but below, shaded off imperceptibly into the cheek. A director passed into the second incision ran with very slight resistance, as if through a soft tissue, along the inner wall to the apex of the orbit, and on withdrawing it the groove was found filled with a soft gelatinous substance, which was not more minutely examined, because no microscope was at hand. At 2½″ bare rough bone was felt.

The left nostril was much obstructed, which, he said, had been the case for a fortnight. This appeared to be partly the result of an old injury, which, eight years before, had permanently bent his nose to the right, but mainly to proceed from a general puffiness of the mucous membrane, and from an adventitious growth, apparently a simple gelatinous polypus.

Two of our colleagues regarded the swelling as carbuncular cellulitis, and its close sequence on the blow seemed consistent with the opinion that it was inflammatory; but the characters of the swelling of the lids, its colour and consistence, more particularly the sago-grain-like dots in the skin, and the great enlargement of the caruncle, reminded me so forcibly of what we sometimes see when the glands and skin under the jaw are rapidly infected in those exceptionally rapid cancers of the tongue which run their course in a few weeks, that I could not come to any other conclusion than that the disease in the present case was cancerous. It was evident, from the proptosis, epiphora, and epistaxis, that the morbid growth had already extended into the orbit behind the eyeball, and now also invaded the nostril, and that surgical interference, to be of any use, should be early.

Knowing my interest in orbital tumours, Mr. Wordsworth courteously transferred the patient to my charge, and, March 2nd, I took him into the Middlesex Hospital, in order that I might watch him more closely than I could at Moorfields.

At a fresh consultation (at the Middlesex Hospital) most of my colleagues concurred in the view taken by two of the Moorfields Hospital staff, that the disease was inflammation of the cellular tissue, but one coincided with me that it was cancerous, It was agreed to watch the case for a few days longer.

I mention these facts to show the difficulty of forming a positive diagnosis.

Compresses soaked in goulard water were applied, and quinine gr. ii. were ordered to be taken twice a day.

March 6th. Since the last date there has been bleeding several times from an ulcerated spot in the caruncle; the first time it was only a few drops, but subsequently it increased to a continuous trickle. He was easier after the bleedings. He had now a worn, anxious expression; his nights were disturbed by a hacking cough, for which ether and henbane were prescribed.

March 9th. No more bleeding; his cough harasses him, causing much pain in the brow. The caruncle and lower eyelid are more swollen, and the hardness and redness have spread further in the cheek. An increased number of sago-like grains are now visible in the lower lid.

13th. The swelling is greater; he has more pain; a slight fulness is perceptible in front of the tempero-maxillary joint, and behind the angle of the mandible. Are these enlarging lymphatic glands? It had now become evident that complete extirpation of all the diseased parts afforded the only chance of prolonging, if not saving life, and the rapid rate of growth made it equally plain that further delay was not justifiable. The patient, when candidly informed of his desperate condition and prospects, accepted the slight chance held out to him by surgical interference.

14th. Having put him under the influence of chloroform, I made a preliminary incision into the tumour, and a small piece having been taken from its interior, the microscope shewed it to consist mainly of large mono- and poly-nucleated cells of an epithelioid type, which could not possibly be mistaken for any inflammatory product.

The diagnosis of cancer being thus positively confirmed, the eyeball was first enucleated (although not actually implicated, this was necessary in order to get at the intra-orbital part of the tumour behind it); the close adhesion of the tumour to the ocular capsule (O'Ferral's) occasioned a slight difficulty in doing this. The eyelids, and all the brawny part of the cheek and of the side of the nose, were encircled by a cut down to the bone, and rapidly dissected away. This done, I found the whole orbit filled with a soft, friable, succulent mass, which passed through

a gap in the orbital floor, and nearly filled the antrum, without, however, having any connection with the walls of this latter cavity, the surfaces of which were lined by normal mucous membrane. This cavity also contained a little glairy mucus.

The tumour had also extended into the nose through the osplanum, and filling the back of the left nasal passage, projected in the form of a capsulated globular lobule through the posterior nares into the pharynx above the soft palate. (A soft simple polypus was taken from the front of this nostril.) In order to follow the tumour in this direction, I had to cut away much of the maxilla, the left nasal bone, and the lateral mass of the ethmoid. It was now possible to detach the periosteum from the bones with a raspatory wherever the tumour appeared to have been connected with these latter, and when this had been done the bony surfaces were rubbed over with a hot iron. Strips of lint, spread with chloride of zinc paste, were applied to the entire wounded surface of the bone and soft parts. This completed the operation.

The bleeding was very free, but yet less than I had anticipated, and had quite ceased before the zinc was applied. The enlarged ophthalmic artery cut at the apex of the orbit continued to bleed in spite of the cautery, but was stopped by a small compress dipped in Liq. ferri perchlor.

The frontal sinus was opened in the course of the operation, and found not to be involved.

The limits of the tumour were much more extensive than I had anticipated, particularly towards the pharynx and the antrum, for the body of the maxilla was not expanded nor the palate depressed.

The minute structure was characteristic of epithelial cancer. The preponderating histological elements were large scale-like epithelial cells, closely packed in cylindrical masses and in concentric clusters. These, with a small quantity of fibrous, interstitial connective tissue, and blood-vessels, made up the great mass of the tumour in which no remains of the normal tissues were found; but along the line of extension where cancer was invading the normal tissues, there was a thin stratum of a new cell-tissue

pushing out organoid buds among the normal tissues, and this new tissue consisted of small roundish cells about the size of those of the deeper layers of the rete mucosum of the cutis.

For some hours after the operation, I was anxious lest the fluids from the wound, saturated with chloride of zinc, trickling over the upper surface of the velum palati into the throat, might excite inflammatory œdema of the fauces and epiglottis, or perhaps poison the patient, but nothing of the kind occurred.

15th. Pulse 104; skin cool; tongue clean; slight swelling and redness of the edges of the wound and slight œdema of the right eyelids. His diet was strong beef-tea and a couple of eggs, and brandy ʒviii, but he said he had not enough to eat, and asked for a mutton chop, which was given him.

16th. Pulse 100; slept fairly; slight extension of the inflammatory redness. Complains of headache, which was relieved by a caoutchouc bag of ice. It would be too tedious to detail the daily report, and from this time I shall only mention the leading points. The dry, hard bark-like eschar formed by the caustic zinc was soon detached at its circumference by a narrow line of ulceration, which was quickly followed by cicatrization and shrinking, so that when the entire eschar fell way, April 11th, the wound was much smaller than at the time of the operation.

April 24th. At the upper and inner angle of the orbit, and on the septum nasi, the granulations are rather exuberant. Does this overgrowth arise from the irritation of small sequestra not yet detached, or does it mean a recurrence of the cancer?

Several sequestra were withdrawn from among the granulations, which subsequently assumed a more healthy appearance.

May 7th. The outer edge of the orbit is becoming loose.

23rd. A large hard fixed nodule has become palpable since the last note, behind the angle of the jaw. Three days later this had much enlarged.

29th. The loose edge of the orbit was lifted off.

June 1st. A fleshy knob has sprouted from the lower and outer part of the orbit corresponding to the spheno-maxillary

fissure. The manifestly cancerous infection of the lymphatic gland, noticed on the 23rd, made it useless to destroy this. Both it and the gland behind the jaw increased, so that by June 8th he could not chew solid food, and could only separate the jaws to a very slight extent.

29th. Deglutition is now difficult. The tumour behind the jaw is very prominent, and its summit is soft and red; it is evidently about to break. The orbit is becoming filled with a growth from the outer wall.

In a few days the tumour behind the jaw broke and fungated, and from this time bled frequently. It widely infiltrated the neck, and from time to time large portions sloughed away, meanwhile the orbital growth made little progress. In spite of the frequent loss of blood and the profuse discharge from the wound, he survived till November 29, 1866.

Mr. Arnott, our Surgical Registrar, has supplied me with the following memorandum of the post-mortem examination:—

"There is a large sloughy cavity in the place of the left orbit which reaches deeply towards the pharynx, and outwards to the zygoma, while at its inner side are seen the remains of the septum narium. A protuberant, fungating ulcer reaches from the edge of this cavity to below the lower jaw. It involves all that remains of the cheek, and below it nearly as far as the collar-bone, the neck from the middle line, below the ear, nearly to the vertebral spines, is hard and swollen. The right side of the neck, below and behind the jaw, is similarly swollen in a less degree. The swelling proceeds from a cancerous growth which has destroyed the outer bony wall of the orbit, the part of the malar bone not removed at the operation, a portion of the ascending ramus of the lower jaw, and all the soft tissues in these situations. The sterno-cleido mastoideus muscle is lost in the centre of the cancerous mass, which pushes aside but does not structurally implicate the arteria carotis communis or vena jugularis interna. There were a few scattered knots of chalky tubercle in the lungs, evidently of old date, and with this exception the thoracic and abdominal viscera were healthy. No secondary infection of distant lymphatic glands was found."

In the progressive, continuous infection of the neck, and the absence of distant, interrupted infection, we see the

same features which are so generally observed in epithelioma of the lip and uterus, which, while they infect the next lymphatic glands, are rarely accompanied by secondary tumours in distant organs. It is just this minor diffusibility which makes epithelioma less desperate than scirrhus, and brings it more within the scope of surgery. The longer average duration of life in epithelioma over that in other forms of cancer, 53 months according to Sibley, proceeds from the same cause. This case, lasting only about 10 months, was therefore an unusually rapid one, which makes the postponement of the operation the more to be regretted.

Although operative interference in cancer of the eyeball or orbit is discountenanced as useless, or worse than useless, by some surgeons, these constitute a very small and rapidly decreasing minority, and it is generally allowed that thorough extirpation alone offers a prospect of immunity from recurrence, relative or complete, whether the tumour be a carcinoma *stricte sic dictum*, or an infecting sarcoma. But here unanimity ceases, for beyond agreeing that thorough extirpation is only to be hoped for at an early stage, when the growth originates in the bones or in the periorbita, we find surgeons of the highest reputation not agreed as to the best way of operating, but practising different methods, some of which, from their very nature, involve the practical non-observance of that principle on which every operative measure should rest, viz., that it should be thorough for the particular end in view. Perhaps the chief reason of this is the supposition that the situation of the orbit, especially its nearness to the brain, does not admit of the same methods of operating as are advantageously employed upon the trunk and limbs; while a minor reason is the want of personal familiarity with the resources of general surgery by those who exclusively devote themselves to a special branch.

As far as I have seen and read, the two methods of removing orbital tumours in common use with us are exci-

sion of the tumour with knife or scissors, and its evulsion with blunt instruments. The first I have, till lately, always adopted myself, too often to see before long the tumour sprout up anew. Nor is this surprising, since diffusibility, infectiousness, is the leading feature of carcinoma, and in a scarcely less degree of some sarcomata; and the larger number of orbital tumours fall into one of these classes. The microscopic examination of the tissues around a cancerous breast, at points where neither touch nor unaided eye could detect any traces of the morbid growth, has again and again proved their already infection; and in an intraocular cancer, where the sclerotic appeared, on close scrutiny, to be entire, I have found the loose areolar tissue outside the eyeball, between the sclerotic coat and the capsular fascia, as well as that between the outer and the inner sheath of the optic nerve, to be microscopically infiltrated. It is therefore evident that the removal of those tissues only which are so grossly diseased as to be appreciable as such by sight or touch is insufficient, and that we ought to adapt to the orbit the maxim which enjoins the excision of a zone of normal tissue whenever we excise a cancerous or other infecting tumour seated in the trunk.

The same incompleteness inseparable in most instances from simple excision, belongs in a much greater degree to the practice of tearing out orbital tumours with blunt elevators. Cysts and encapsuled tumours may no doubt be entirely enucleated with these instruments, but an infiltrating growth, such as cancer, which has no distinct definite boundary, cannot be cleanly shelled out with them. Whenever I have seen them used the tumour has been torn in pieces, and so ragged a wound has been left that a suspicion, sometimes amounting to a conviction, that shreds of the morbid growth have been left has forced itself upon me. But if these blunt instruments are unsuitable for the complete extirpation of an infiltrating tumour, there is also an additional reason why they should not be used for

this purpose. It requires so much force to wrench away the tumour from the orbital walls, that these latter may be inadvertently pierced, and the elevator or director plunged into the brain; or pieces of the roof of the orbit may be torn away without the operator being at the moment aware of the damage he is inflicting: both these accidents have actually happened.

The best method is, I believe, a combination of excision and escharotics. By clipping out the mass with a blunt-pointed scissors, curved on the flat, strong but not unmanageably large, and carefully exploring with the finger as we proceed, we avoid the risks incurred when elevators are employed. In this way I have safely removed both very tough and very friable tumours. When the orbit has been thus emptied, if its walls are anywhere compromised by the disease, the periorbita can be detached with an elevator or a raspatory, and as much of the bone itself as is necessary removed, and this safely, because the part acted on is directly under the finger, and the degree of force used can be exactly estimated, and its direction controlled. This done, for the double object of stopping any bleeding vessels, and completing the destruction of any part of the tumour inaccessible to the scissors, the wounded surface should be touched with the hot iron, and when the bleeding has completely ceased, the operation is finished by coating the wound with lint spread with the escharotic zinc paste, the formula for which I gave in the last number.

The advantages of this escharotic are its manageability, the small amount of local inflammation, and the slight symptomatic disturbance which follows its use, even when it is applied to a very large surface. The depth to which it will bite can be regulated with some certainty by the thickness of the layer of the paste, and the eschar is a hard dry bark, the separation of which is followed step by step by cicatrization, so that by the time it is fully detached the wound is not unfrequently reduced to one-third or less

of its original size. These characteristics of the zinc escharotic allow us to apply it to the orbital walls with more safety than any one who had not watched its use would be inclined to credit. Of this the case to which these remarks are appended is a good example. The practice was originated, as far as I know, in the Middlesex Hospital by Mr. Moore, and it has been adopted by Mr. De Morgan, Mr. Lawson, and by myself, in several cases with very encouraging results. In no instance has fatal intracranial inflammation been provoked, but I may not conceal that in three instances there was considerable excitation manifested by epileptiform fits a few hours after the operation. These, though sufficiently alarming, ceased, and did not recur. There is a disadvantage about which I must add one word. During cicatrization the eyelids are drawn into the orbit, so that an artificial eye cannot be adopted. No doubt this is a drawback, but one of little moment, seeing that the stake is life.

## 2. A CASE OF ORBITAL SARCOMA FOR COMPLETING THE EXTIRPATION OF WHICH THE CAUSTIC ZINC-PASTE WAS USED WITHOUT INJURY TO THE EYEBALL.

By J. W. Hulke.

In the case just related, and in that which I recorded in the last number, the zinc paste was extensively applied after the removal of the eyeball. The following shows that, with precaution, it may be used in suitable cases, where the eyeball is present, without injury to this latter:—

A girl, æt. 18, came to the Royal London Ophthalmic Hospital June 6, 1866, with a swelling in the situation of the lachrymal sac. She said that five weeks before, after exposure to cold, the right side of her face had become red, swollen, and shining, and that for two years previously she had been troubled with epiphora.

The history was that of cystitis following obstruction of the nasal duct, and the swelling, at a cursory glance, was not unlike a distended lachrymal sac. It was, however, incompressible, and its contents could neither be squeezed away into the nose nor did they regurgitate through the lachrymal puncta. This led me to examine it more carefully. It was evidently closely connected with the inner wall of the orbit. Its surface was even, and its outline oblong. Its upper border, above the tendo oculi, was indefinite, and its lower end, in the form of a free, round knob, reached to the junction of the inner and middle third of the lower margin of the orbit. The swelling was elastic, but harder than most cysts. The skin did not adhere to it, and there was not any œdema of the neighbouring tissues.

From the solid feel and lobular form of the swelling, I suspected a new growth; but two of my colleagues were disposed to regard it as a mococele of the lachrymal sac. The Royal London Ophthalmic Hospital being full, I sent the patient into the Middlesex Hospital, placed her under chloroform, and to put the question of sac beyond doubt, slit up the lower punctum and canaliculus into the sac, and then passed a large probe through the nasal duct into the nose. The passage was pervious, no pus or mucus escaped, and the size of the swelling was not changed. The diagnosis being thus confirmed, I dissected out the tumour which sprang from the periorbita behind the sac, sparing the conjunctiva which it had not implicated, when the slight bleeding had quite ceased, and coated the nasal side of the wound, where the base of the tumour had been attached, with the chloride of zinc paste spread on small pieces of lint, the dry surfaces of which were turned towards the conjunctiva which was further protected against the caustic by a little charpie. The conjunctiva and eyeball with its muscles were not injured by the caustic, the eschar exfoliated, the wound healed soundly, and during the time the patient remained under observation there was no sign of recurrence. The histological characters of the tumour were those of a spindle-cell sarcoma.

## REPORT ON CASES OF CONGENITAL AMAUROSIS.

By Jonathan Hutchinson, F.R.C.S.

I publish the following cases as a contribution to our knowledge of the conditions under which congenital blindness occurs. They are all in which I possess notes of ophthalmoscopic examination. My comments on them may be arranged conveniently under the following heads:—

*Marriages of Consanguinity.*—In but one instance were the patients the offspring of marriages of relations (Cases 2 and 3). In this case, however, two children had suffered. Neither of them were born absolutely blind, but both were nearly so, and both had white atrophic optic nerves. Both were intelligent, and enjoyed the full use of the other senses. Although in several of the other cases no note as to parents' history is recorded, yet this absence is to be held conclusive as to the point referred to, as I never omit to inquire.

*Microcephalism and Idiotcy.*—Two of the cases were examples of microcephalism in an extreme degree, and the children were probably idiots. In one of these the discs were white, whilst in the other, although the blindness was total, no ocular changes could be detected. In a third case the patient was microcephalic in moderate degree, and the optic discs were white and the choroids extensively absorbed. In all these early closure of the fontanelles was observed. I may here add, that during the past few years I have seen several extreme instances of congenital microcephalism in which the function of sight was yet perfect.

*Hydrocephalus.*—In only one instance was there any tendency to hydrocephalic effusion (Case V). In this instance the discs were grey white.

*State of Pupils, &c.*—In all the cases the irides were brilliant and responded well to atropine. In most of them

the pupils were of normal size and sluggish, but in several, although the child was blind, they acted moderately. In most cases a certain amount of oscillation and twitching of the globes was observed.

*The Optic Discs and Vessels.*—In one case no change in the disc or its vessels could be appreciated, the child yet being microcephalic and quite blind. In one, after two patient examinations, no disc nor any trace of a retinal vessel could be found. Of the six others, in all the disc was atrophied, grey white, and depressed, and in most the atrophic changes were far advanced. In Cases II and III, the retinal vessels were extremely shrunken; in Case IV they were small, whilst in the others their diminution in size was but slightly marked.

*The Choroid.*—In Cases I, II, III, V, VI, and VII, the choroid showed no morbid changes, whilst in Cases IV and VIII there were evidences of past choroiditis in the presence of large patches where that membrane was wholly absorbed and the sclerotic exposed.

*Conjectures as to Cause.*—Intra-uterine disease (neuritis, &c.) suggests itself as the most probable cause in a majority of the cases, those, namely, in which the optic disc was atrophied, or in which the choroid was absorbed. The present condition of some of the patients closely resembles that of some of those recorded in my paper on Neuritis in Children, at page 307 of the present number. If we suppose that the infants had, during fœtal existence, suffered from intra-cranial disease of similar character to that which the other children had shown at a later period of life, we should have a good explanation of the conditions now displayed. The subject is a very interesting one, and I hope at some future period to record a more detailed and extensive series of cases.

| No. | Name. Reference to note-book. Date of notes. | Age. | Development of head and state of health. | State of Intelligence and of Special Senses. | History of Parents, &c., &c. | State of the Pupils, Eyeballs, &c. | Ophthalmoscopic Examination. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 1 | Mary Anne Raynham, p. 13, B. October 14, 1861. | 4 | Born healthy, began to be "ailing" at 10 months. Is small for her age, but well fleshed and florid; in good health for previous year. When two years old she had no use in her ankles and could not walk. | Her mother doubted whether she could see a candle. In the daylight could not see the largest objects. She walked steadily. Backward in talking, but could now say almost anything. | Her mother stated that during pregnancy she was suffering from great anxiety. She believed the child to have been born blind. | Both pupils large, but not remarkably so; equal and round. Irides blue, lustrous. Globes of good size. The eyes looked well enough, but the globes twitched. | Very difficult to examine with the ophthalmoscope, owing to the motion of the globes. Media quite clear; choroids florid; retinal arteries small; veins of full size. Optic discs blue white (but not so conspicuously so as is often seen), and depressed. | |
| 2 | Mary Anne Venables. | 4 | Both quite healthy since birth. The eldest did not walk till two years old, and the youngest | Quite intelligent, clever children, hearing perfect, good tempered. The eldest only saw enough to avoid large objects; would often run against a | Father and mother first cousins. No blindness in the family; no insanity. A boy was born, but he | Fair complexion; grey eyes. In the elder, pupils of normal size, and acted fairly. The globes | *The elder one.*—Both optic discs perfectly white, and their vessels shrunk to the most extreme degree. Neither arteria nor vena centralis to be | These children were the offspring of a marriage of consanguinity. |

A Tabular Statement of Eight Cases of Congenital Amaurosis—*(continued)*.

| No. | Name. Reference to note-book. Date of notes. | Age. | Development of head and state of health. | State of Intelligence and of Special Senses. | History of Parents, &c., &c. | State of the Pupils, Eyeballs, &c. | Ophthalmoscopic Examination. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | could now just stand. | chair. The younger saw the clock. Her mother thought her getting worse, and believed that she could see well till six months old. | lived only four months. His sight was believed to be good. No other children. | oscillated somewhat in both. | traced beyond the margins of the disc, and they could only just be discovered on the disc itself. | The elder one was an instance of congenital blindness, the younger was believed to have enjoyed some sight for 6 months. Neither of them were as yet absolutely blind. |
| 3 | Emily Venables, p. 63, B. August 14, 1862. Sister of the above. | 1½ | | | | | *In the younger.*—Great difficulty in examining the fundus. Optic discs large, and very white, bluish white and dead, without a trace of pink. The arteria and vena centralis very small, but not nearly so small as in her sister. | |
| 4 | Margaret Louisa Flitt, p. 158, B. January 8, 1866. | 10 wks. | Intelligent and healthy, but its forehead and upper part of head | It grasped with its hands readily. Appetite large, never satisfied. Too young to test the other | The parents were not related before marriage. No history of | The globes twitched a little. The pupils dilated well | There were very large abrupt patches of absorbed choroid where the sclerotic was quite bare. | This was an eight months' child. A case of |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | decidedly small, and the anterior fontanelle already all but closed. | senses. | blindness in the family. An elder sister eighteen months old quite healthy and enjoying good sight. | with atropine, but owing to the child's struggles it was difficult to get a sight of the fundus. | There were not many large accumulations of pigment. I did not get a good view of the disc itself in either eye, but I believe that it was in each quite white, and the vessels small. | microcephalism, though not to an extreme degree. |
| 5 | Alice Maud Rose, p. 232, B. February 12, 1866. | 3 mo. | Head large and fontanelles very widely open. There was a superficial nævus on each upper eyelid. | Features well formed. Hearing good. | The mother's first child. | Pupils of normal size. She rolled the eyes about, but the globes did not twitch. | Discs grey-white, with black rims, the margins being distinct. Veins rather large, the arteries rather small. There was no evidence of neuritis nor retinitis. | |
| 6 | Mary Ellwood, p. 258 B., May 8, 1865. | 15 mo. | Forehead small, face and ears large. Fontanelles early closed. The mother stated that they had always been so. | She did not seem to notice anything brought before her, but she noticed the slightest noise.<br>*Dec. 11th.*—The child appeared idiotic, never took hold of anything. Her limbs were flabby and thin, and she made no attempt at standing. | The fifth child, one died from measles. The eldest was nine years old. They were all fine, healthy children.<br>The parents were not related before marriage. | Atropine dilated the pupils well. | We administered chloroform Dec. 11, and examined carefully. Nothing whatever abnormal could be detected. The discs were of good colour, and the vessels of good size. | A case of microcephalic idiotcy. The absence of optic nerve disease is important. |

A Tabular Statement of Eight Cases of Congenital Amaurosis—*(continued)*.

| No. | Name. Reference to note-book. Date of notes. | Age. | Development of head and state of health. | State of Intelligence and of Special Senses. | History of Parents, &c., &c. | State of the Pupils, Eyeballs, &c. | Ophthalmoscopic Examination. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 7 | Joseph Lane, July 12, 1866, p. 46, C. | 10 wks. | Head a little too narrow in front and too broad behind. The whole head rather small. | Note omitted. | Note omitted. | Note omitted. | Both discs grey, their margins indistinct. Choroid and retina healthy. The central artery of medium size, but somewhat diminished. | |
| 8 | An Infant. Nov. 27, 1863. | 6 mo. | Head very small; forehead low, and very narrow. | Expressionless physiognomy. Could, however, be made to smile occasionally, and would take notice when spoken to. No perception of light. | Note omitted. | Pupils normal, and dilated well with atropine. | The optic discs could not be found, nor were any retinal vessels seen. Large patches of choroid were absorbed, exposing the sclerotic, which at these parts was not crossed by a single vessel. | A case of microcephalic idiotcy. It is possible that the optic nerves were wanting, but the examination was made under difficulties. |

## CASES SELECTED FROM MR. DIXON'S OUT-PATIENTS.

*Complete paralysis of the left fifth nerve as regards sensation—Motor function unimpaired—Lachrymal gland active—Impaired taste and smell—Superficial ulceration of the cornea—Suspicious symptoms as regards syphilis.*

(Reported by Mr. W. Square, Clinical Assistant to Mr. Dixon.)

Charlotte Waters, æt. 30. was admitted on December 3rd, 1866, a healthy-looking woman; a widow for ten months. Has had three children, of whom two are alive and one died in teething. The survivors are perfectly healthy. Her husband was "a healthy man, but subject to abscesses in various parts of his body." She has had a diseased upper jaw for four years on the left side. There is a scar at the ala of the nose, where bone has been extracted. She has lost four teeth on that side, three molars and a bicuspid. They simply dropped out, without any pain or swelling, and were not decayed. The rest are good. There are two small sores at the inner canthus, one above and the other below the caruncle. They were made by nitric acid to cure small ulcers. The vessels of that side are slightly engorged. She applies to this hospital on account of ulceration of the cornea. It is extensively and superficially abraded. This began fourteen days ago. The conjunctival vessels are injected. The iris acts well. There is total loss of sensation over all parts supplied by the fifth nerve on this side. All the skin of the face with the exception of the part supplied by the cervical plexus, viz., between the meatus of the ear and the angle of the mouth, is without sensation. The cornea and conjunctiva are in the same condition. The loss of sensation extends into the mouth, implicating the hard palate, soft palate, tongue, gums, and inside of the cheek. She has no smell or taste on that side. The hearing is good. The lacrymal gland acts, as she has noticed that she cries with both eyes. The motor root does not seem to be implicated. The masseter is of fair size and acts well. The left temporal muscle, perhaps, is a trifle smaller than the other. She cannot count fingers with

the left eye, but has perception of light. She says that the sight was quite good until the cornea began to ulcerate. It is too dim to admit of an ophthalmoscopic examination. There has never been any pain. The upper maxilla and the malar bone are tender on firm pressure. There is apparently more necrosed bone to come away.

There is no positive evidence in this case to support the diagnosis of syphilis. The character of the ulceration in the cheek is very suspicious, and is rendered more so by the fact that the alveolus is diseased.

*Partial paralysis of the left fifth nerve, both of its motor and sensory functions—History of Epileptic fits and of pain in the parts supplied by the nerve now paralysed—Impaired taste and smell—Ulceration of the cornea—Doubtful diagnosis of syphilis.*

(Reported by Mr. W. SQUARE, Clinical Assistant to Mr. Dixon.)

Sarah Stone, æt. 27, admitted December 6, 1866. A pale, unhealthy-looking woman, subject to fainting fits. She has had rheumatic fever and has pains constantly flying about her limbs. She is very subject to sore throat and a rash on the skin with indurations under the spots. She believes that she inherits epilepsy from her father. Her husband is a soldier and in good health. There is no confession of syphilis on either side. She has had iritis in the right eye, which has left adhesions at the lower and outer part. She, however, reads brilliant with it. About four months ago she had three epileptic fits, which were followed by pain all over the distribution of the fifth nerve of the left half of face. She found, too, that there was diminished sensibility in that side. The pain was worst in the eye, especially at night. The cornea has a leucoma as from old keratitis. She can only discern light with this eye. The conjunctiva is slightly congested. It is sensitive but not nearly so much as the other. The under lid has entirely lost its sensibility. In the rest of the skin supplied by the fifth sensibility is only impaired, not lost. Taste and smell are both defective, and she complains of a nasty taste at times. The masseter and temporal muscles act, but not very well, and she complains of loss of power on that side. The

motor seems to be implicated to the same extent as the sensory root. She has had enlarged cervical glands. Her family is reported to be generally healthy.

In this instance the suspicion of a syphilitic taint is strong, although there is no conclusive history. The woman is liable to sore throat and to rash, and has had a former attack of iritis.

*Blindness with white atrophy in one Eye, with paralysis of third and fourth nerves on the same side—Occasional Hemiopia and failure of sight in the other Eye.*

(Reported by Mr. Waren Tay, Clinical Assistant to Mr. Dixon.)

In the following case the symptoms seem to point clearly to the existence of a new growth at the base of the brain already involving most of the orbital nerves on one side, and slowly extending to the other.

Mrs. Manifold, aged 27, came under Mr. Dixon's care in the autumn of 1864. The following is the note made at the time:—

She is tall and thin, and does not look specially out of health. She has been married for seven years, and her husband is in the 1st Life Guards.

She thinks that her right eye began to fail twenty months ago, and that it has been quite blind for nine months. There was no drooping of the lid at first, only during the last two months, and it has often passed off for a time. She has had very severe pain in the head at times, attended by a very peculiar excitable feeling, as if she should go out of her mind. She had a blow on the right eye six years ago, but has never had any fall or severe injury to the head. Once, for about a week, she thought her right arm was becoming paralysed, but it passed off. She is very cheerful, and remarkably voluble in speech. There is no history of symptoms suspicious of syphilis, and when questioned directly no clue was obtained. She has been much under treatment for her eye, and the pain in her head, but with no material relief. She has often been giddy, but has never actually fallen down. She has never been sick. She can walk well, and con-

siders herself stronger now than she was formerly, and she has much less pain in her head now than some months ago.

The right eyelid drops so as completely to cover the eye, and she has not the slightest power of lifting it. The eye is strongly everted, and the pupil dilated to thrice its normal size and fixed. She has no perception of light. She cannot move the eye upwards or downwards. The fourth nerve appears also to be quite paralysed. The sixth acts strongly. The left pupil is large and sluggish, but will act when exposed to light. She can with this eye with difficulty spell letters of No. 14 (Jaeger). She complains that after looking stedfastly, a black shade will cross her sight. Sometimes she can see only the half of an object. There is no drooping of the eyelid on this side. On examination with the ophthalmoscope the optic disc of the right eye was found white and atrophied; that of the left paler than natural, but not to any great degree.

December 11, 1865.—Mr. Dixon states that she is gone to Windsor with her husband, and that when he last saw her she was in the same condition as that above described.

It is somewhat unusual that no stage of severe head symptoms should ever have occurred in this case. The changes in the nerve appear to have been those of atrophy without neuritis. The circumstance that one eye should escape for so long an interval is also decidedly exceptional to what we usually see in this group of cases.

Part II.

# A Periscope

OF

# CONTEMPORARY OPHTHALMIC LITERATURE.

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## PROFESSOR VON GRAEFE ON EXTRACTION OF CATARACT.

In the Archiv. f. Ophthalmologie, vol. 12, part 1, Professor v. Graefe has published some lengthy supplementary remarks upon his now well known method of "modified linear extraction" of cataract. Speaking from a personal experience of about 300 operations, the Professor states that in 90 per cent. of them he has obtained a complete result, with acuity of vision between $\frac{1}{6}$ and $\frac{5}{6}$. Of these cases, in 82 per cent. the healing process was absolutely normal, and in the other, 8 per cent. was interrupted by some transitory accident. In 10 per cent. of all the cases operated upon the results were unsatisfactory; but among these the majority were cases of imperfect success, admitting of improvement by subsequent operation. On the whole, it appears that an acuity of vision reaching or exceeding $\frac{1}{6}$ has been ultimately attained in 94 per cent. of the operations. These figures have been yielded by patients not only not selected, but in whom some of the precautions ordinarily taken in the flap operation have been laid aside. In some of them, for example, an immature cataract has been removed from the second eye a fortnight after the removal of a mature one from the first. In others the the eyes or eyelids were in various ways diseased, and the operation itself was modified in certain details. As the result of this experience, v. Graefe concludes that, in eyes favourable for flap extraction, the prospect of success is certainly equally great by the new method; and that, in eyes unfavourable for flap extraction, the prospect of success is considerably greater. Considering also that modified linear extraction diminishes the inconvenience to the patient and the duration of treatment, the author is of opinion that it may be accepted and practised to the entire exclusion of the flap method of operation.

After some observations on the position of the patient and operator, and on the direction of the light, v. Graefe proceeds to discuss the use of chloroform. He employs this agent in only a small number of cases (7 per cent.), and less frequently now than formerly. He thinks that a moderate and controllable action on the part of the ocular muscles promotes the escape of the lens, and that the power to make the patient "look down" facilitates the removal of cortical remains. On the other hand, chloroform is of essential service when the action of the ocular muscles is spasmodic or excessive, either on account of mechanical conditions, such as unusual tension of the lids, prominence of the globes, or blepharophimosis, or on account of extreme reflex irritability, or of want of self-control. The surgeon must therefore give or withhold chloroform in accordance with the state of the eye and its appendages, viewed in relation to the general condition of the patient.

The spring speculum in common use has been modified by v. Graefe by bending it backwards towards the temple of the patient, so that it is not in the way of the operating hand. Professor v. Welz has further improved the instrument by adding two little branches to the palpebral portions, by means of which it can be grasped and controlled with facility, and can be removed from the eye with greater delicacy than before. Stress is laid on the position of the fixation forceps, which should seize the conjunctiva close to the corneal margin, and exactly in a line with its vertical meridian. With regard to the sclero-corneal section, the directions formerly given remain in force; and with regard to the formation of a conjunctival flap to the incision, the following conclusions are stated: 1. The presence of a conjunctival flap, covering the whole length of the wound, certainly promotes rapidity of healing and firmness of cicatrix, but plays a very subordinate part in the ultimate result of the operation. 2. Slight differences in the size of the conjuntival flap are wholly unimportant, but it is better that its centre should be sloped a little downwards, and not cut to a point running upwards. The latter form is apt to become rolled, and to occasion swelling and discomfort. 3. Very large conjunctival flaps, extending more than a line and a half from the corneal margin, or reaching towards the reflection, are to be avoided. They occasion bleeding, infiltration of the submucous tissue with blood, trouble from coagula, and difficulties in the removal of the lens and cortical fragments.

With regard to the iridectomy, v. Graefe's experience leads him to insist very strongly upon its being complete up to the angles of the wound. If, from any cause, points of iris tissue are left projecting into the wound, an endeavour must be made to cause them to retract into the anterior chamber, by slight friction upon the eyeball through the closed upper lid, as in prolapsus iridis after flap extraction. In order to accomplish the

complete excision that is desirable, it is well to press a little upon the globe with the closing blades of the scissors. If pointed fragments be left, v. Graefe endeavours to seize and excise them. The drawing out of the iris by the forceps before cutting it must be done carefully and without force; and Mr. Bowman's method of partial tearing from the ciliary margin is recommended with some reservation. v. Graefe appears to doubt whether this or any other method accomplishes the removal of the whole width of the iris; and he cites the case of a patient who died from delirium tremens shortly after linear extraction, and in whose eye he found that a strip of iris, half a millimetre in breadth, had escaped his manipulations. He is careful, before proceeding to the iridectomy, to turn down any conjunctival flap that may have been made, in order to avoid any possibility of curtailing it.

If, after the iridectomy, there be bleeding into the anterior chamber, it is desirable to wait a little before proceeding to open the capsule, since the presence of blood interferes with the accurate performance of this step of the operation. If the closed lids be lightly pressed upon with a pad of charpie for a minute or two, the bleeding will usually cease, and then slight pressure on the sclera above the section will cause the escape of the blood. During the opening of the capsule slight pressure should be made on the globe with the fixation forceps, so as to steady the lens, and to offer the necessary resistance to the cystitome. In order to insure complete laceration, the cystitome may be carried round the equator of the lens, a little over its posterior aspect.

For the removal of the lens, v. Graefe states that it is in every case *possible* to dispense with any form of traction instrument, and to accomplish the desired end by the gliding pressure of the back of the spoon upon the sclera above the wound. The advantages of so proceeding are a less liability to loss of vitreous (in the ratio of 4 to 10), and a more complete escape of the cortex. On the other hand, when the lens is hard, its removal by pressure only takes more time, and therefore protracts the tension of the wound and of the iris, and occasions a larger per centage of cases of delayed healing. The use of the traction-hook is therefore to be recommended when the lens does not readily yield to pressure, and will be required in about one operation out of eight, To determine its necessity must be a matter of tactics and experience; but v. Graefe mentions as a chief indication an arrest of the progress of the lens—a stopping or sticking fast on its way. In such cases he still thinks his hook the best traction instrument that has been devised. When the lens is escaping regularly and uniformly under pressure, but threatens to lose the lower part of its cortex, he places the back of the spoon on the lower part of the cornea, and makes a gliding pressure upwards.

The lens being removed, the patient should turn the eye upwards, a movement that promotes the closure of the wound, and that facilitates the removal of the spring speculum.

Finally, it is necessary thoroughly to clear the pupil of cortical masses, and to press down the conjunctival flap into its proper position. After waiting a minute, renewed pressure should be used, in order to empty the chamber of its small resecretion of aqueous humour, by which some small cortical fragments will be floated away in suspension.

The uninterrupted healing of the great majority of the cases has allowed of an extremely simple after-treatment. The compressive bandage has been applied on the operating table, and the patient led away to his ward. Sometimes, on account of the pain occasioned by the fixation forceps, and by the conjunctival wound, cold moist compressors have been applied for the first ten or fifteen minutes, and then replaced by the bandage. This is at first drawn somewhat tightly, in order to procure perfect adaptation of the wound, and to check any tendency to bleeding. The bandage is allowed to remain undisturbed for about six hours. The second bandage, somewhat less tight than the first, to allow room for transudation, but still tight enough to close the eyelids, and to keep them and the globe at rest, may remain from about the sixth to about the sixteenth hour. The third, again, is drawn more firmly, and especially firmly if there be any appearance of swelling. The period from the sixteenth to the thirtieth hour is the most critical, and firm pressure is then of especial value. During this period, v. Graefe makes a fourth ascending turn of the bandage. It is necessary, after linear extraction, to make the second and third turns of equal tightness, and not, as in flap extraction, downwards, to have the second somewhat loose and the third tighter. This method, which closes the downward flap, would tend to open the upper linear section. When there is a plentiful secretion of tears, the compress must be renewed more frequently than usual in the time immediately following the operation; but such plentiful secretion, commonly associated as it is with periodically increased tenderness to touch, is usually stopped by a night's rest, obtained, when necessary, by a morphia injection.

Although the chief purpose of the bandage is fulfilled in the first thirty-six or forty-eight hours, it should be retained for four or five days and laid aside gradually, first for an hour or so in the day, then for a longer period, then for the whole day, and lastly at night. When an eye has become accustomed to a certain pressure, its sudden and complete removal may produce a congestion, followed by hurtful consequences; and it is well known that the ocular vessels are always more distended during the hours of sleep.

Although after linear extraction there is less necessity than after the flap operation to keep the patient at rest, yet still there must be no want of caution in this particular. Opening and inspection of the eye should be avoided when all is well externally, and only practised by the aid of a wax light and focal illumina-

tion, when swelling or other bad symptoms demand careful scrutiny. Atropine should not be instilled until the third day, and then once or twice daily. If it produce irritation of the conjunctiva, a weak solution of acetate of lead may be used alternately with it.

If the section pursue an abnormal course, the treatment is much the same as after flap operation. If within six hours the pain of the wound has not subsided, a morphia injection may be given; and if there be much lacrymation, cold compresses may be applied for five or ten minutes at each change of the bandage. Continuous cold will endanger the healing process. In plethoric persons, who are accustomed to lose blood, continuing pain may require venesection, followed by the morphia injection. In other cases, when the morphia does not remove pain, and the patient is not very feeble, an active purge may be given—ten or fifteen grains of calomel, with as much rhubarb, followed by a tablespoonful of castor oil, if there be no evacuation within eight hours. These means will only be of service when they anticipate the more marked symptoms of mischief, such as profuse secretion and actual swelling of the lids. If these symptoms once appear, the only available treatment is to apply the compressive bandage firmly, to change it as often as the amount of discharge may require, and to apply warm aromatic poultices at each time of changing. At the same time the general condition of the patient may be met by appropriate treatment, either antiphlogistic or supporting.

It is not one of the least merits of the linear extraction that the eye is much sooner out of danger by this method than by the flap operation. In the former the risk of suppuration scarcely extends beyond the thirty-sixth hour. In the latter it extends even to the sixth day. In v. Graefe's practice, suppurative panophthalmitis occurred for the first time in the hundred and fifth operation.

In the cases of partial inflammation, in which the formation of pus is limited in extent, the same treatment by bandaging and aromatic (camomile) poultices must be employed, with morphia injections if the pain be severe and destructive of rest. When the acute stage is past, the effects may require atropine instillation, or sometimes leeching and mercurial friction.

When a slight and sub-acute or chronic irritation is set up, sometimes due to the entanglement of a bit of iris in the wound, sometimes to imperfect coaptation of its edges, sometimes to cortical *débris*, sometimes to a premature removal of the bandage and relaxation of care, it is necessary to continue the ordinary treatment longer than usual, and sometimes (after the third or fourth day) to use leeches. Any projecting portion of iris should be cut off, and the aqueous humour, if turbid, evacuated by puncture. Once only has v. Graefe found it necessary to make a downward iridectomy for the cure of such irritation.

A number of rare accidents are next mentioned and discussed, and the Professor then goes on to the subject of residual capsular opacities. He counsels great care in operating upon them, a delay of at least four months, unless there be increased tension, and a very clear prospect of improvement to sight as an essential condition for interference. A few pages are then devoted to escape of the vitreous humour, and among other possible results of this occurrence, it is said that the presence of vitreous humour in the wound may be a source of delayed healing and irritation, and therefore of danger to the result.

The death from delirium tremens, already mentioned, afforded evidence of the exact apposition of the margins of the wound in linear extraction. After flap extraction, the margin of the flap always falls a little below the level of the part from which it was severed.

With regard to the best time for the performance of a cataract operation, there are several circumstances to be taken into account. Sometimes failing vision interferes with the power of the patient to earn a living; and it is necessary to operate earlier than one would choose to do under more favourable circumttances. Sometimes failing vision affects the spirits and health so much that on this account an early operation is desirable. But, *ceteris paribus*, and with some exceptions, we say that both unripe and overripe cataracts are unfavourable for flap extraction. v Graefe thinks that unripeness is of far less importance as an objection to linear extraction; although he does not deny that the transparency of portions of the lens may place a difficulty in the way of entire removal. The practice based upon his present experience is as follows:—

1. When with monocular cataract-blindness the second eye is completely healthy, extraction should only be undertaken, in patients above the age of 50, under peculiar circumstances, or at their urgent desire; and never in the grey-headed. With young or middle-aged people it may be undertaken even before the cataractous eye is quite blind.

2. If cataract be so far advanced in the second eye that the patient can no longer read rapidly, the operation may be performed without fear upon the eye first affected, even if its cataract be be not quite mature. If, in spite of commencing cataract in the second eye, the patient can still read, it is then desirable to wait for the maturity (but not over-maturity) of the first.

3 When both eyes are nearly equally affected, it is unnecessary to condemn the patient by delay to the suffering attendant on increasing helplessness. The worst eye may be operated upon when its cataract approaches maturity; and the other eight or fourteen days later, when the result of the first operation is declared.

4. The same principle applies to the very gradual laminar

cataract formations; and to posterior cortical and polar cataracts when they exist in both eyes, and interfere seriously with vision.

5. When one eye has made a good recovery from the operation, the second, in a healthy patient, may be treated boldly, and its cataract removed in an early stage. There will be much better vision with two eyes from which cataracts have been removed, than with one such while the other is still cataractous.

The paper concludes with some account of the influence of age, health, and various conditions of the eye, upon the results of the operation. Upon these points, of course, larger statistics will shortly be forthcoming.

### REPORT OF THE IN-PATIENTS TREATED IN THE ST. PETERSBURGH EYE HOSPITAL IN 1863.

*By Drs. Blessig, Magauly, Weyert, and Börling. Petersb. Med. Ztschr.* 1865.

This report treats of the cases of 544 patients. During the same year 6,684 out-patients were also treated; but the authors reject them from consideration, as not having been sufficiently under observation for statistical purposes. We select some of the most important statements.

There is a description of an interesting case of diphtheritis conjunctivæ occurring in a boy four years old, previously in perfect health, and terminating in death on the tenth day.

"Notwithstanding the use of iced compresses and calomel, the morbid process spread to the connecting tissue of the eyeball as well as to the skin of both eyelids. An ulceration appeared upon the under lip, and the wound from a previously applied blister behind the ear also shared in the disease. The child sank very rapidly, although all means of support were used."

207 persons (101 males and 106 females) were treated for trachoma and its consequences. 17 were between 5 and 14 years; 58 between 15 and 24; 99 between 25 and 39; 28 between 40 and 59; and 5 between 60 and 79. In only 14 cases the cornea and eyelids were free from consecutive disorders. Trichiasis or entropium was present in 193, almost always with pannus, opacities, and so forth. The treatment was mostly surgical; and in 100 cases operations upon the lids were performed. Iridectomy was required in 2 cases, and paracentesis in 16, on account of corneal ulceration.

In 39 cases of corneal ulcer and hypopyon (27 males, 12 females), von Graefe's treatment by atropine, compressive bandage, and warm fomentations, was almost invariably successful. Paracentesis was required 28 times.

Necrosis of the cornea occurred three times in both eyes.

Two of the patients were children, all were marastic and strumous. The disease was painless, but uninterruptedly progressive.

Several cases of iritis, choroiditis, and retinitis are carefully described; all of them interesting, either on account of the ophthalmoscopic appearances or of the treatment. They do not admit of being condensed.

Iridectomy and iridenkleisis were each performed twice for lamellar cataract (*Schichtstaar*) with good results. In another case, the patient being unruly, the capsule was wounded; and the resulting traumatic cataract was afterwards removed by discission. Six operations were performed for soft cataract; in two cases with unfavourable results. In 24 operations for hard cataract it was found that an iridectomy did not increase the average of success of the flap extraction.

Among the *injuries* a curious case is related, in which a splinter of iron had penetrated the cornea, and was pushed quite into the anterior chamber in the first attempt at removal. The chamber was twice opened, and iridectomy was performed, but the piece of iron could not be found. After a month it became incapsuled by effused lymph; and vision was perfect.

### CHROMIDROSIS OF THE EYELIDS.

Professor Rothmund (Monats. Bl. f. Augenheilk. March to May, 1866) records two examples of this so-called disorder. They were both due to the adhesion of atmospheric dirt to eyelids rendered greasy by an excess of sebaceous secretion. The patients were young girls, living and working in a smoky atmosphere. The author believes that other cases recently reported have been really of the same character.

### ON THE ORIGIN, SPREAD, AND PROPHYLACTIC TREATMENT OF TRACHOMA.

*By Dr. H. Fischer* (*Allg. Mil. Arztl. Zeitg.*, 1865) *and Dr. V. Hoffmann* (*A. A. O.*).

Dr. Fischer attributes the so-called military ophthalmia entirely to the overcrowding of barracks, and to the generally defective arrangements therein, and he cites many facts in support of his opinion. When there is no purulent discharge, he strongly recommends that the men attacked should be dispersed in the neighbouring country; but the presence of pus renders it necessary to enforce strict confinement to hospital. For the prevention of the disease he relies upon proper sanitary arrangements, and upon strict cleanliness, both of person and dwelling. For the prevention of its extension when existing, he advises isolation

of the sufferers, careful regular inspection of the healthy, the setting up of hospital tents, careful treatment of all occurring cases, and strict watchfulness over convalescents.

Dr. Hoffman reports an interesting illustration of the effect of removal to a better ventilated place in checking an outbreak of military ophthalmia. The Austrian garrison of Mainz, about 5,000 strong, had 100 men invalided from various forms of eye disease, at the beginning of 1864. By March this number increased to 196, without any marked prominence of trachoma, and with an isolated case of purulent ophthalmia. In April and May there were 12 purulent cases; in June, 23; in July, 47. There was then a decrease, but the disease again gained ground in October, when there were 29 purulent cases, and two or three invalids from eye disease in every company. In November the troops were moved into airy and spacious quarters. In December there were 20 purulent opthalmiæ among 112 catarrhal. In January, 1865, only 5 purulent cases; in February, 2; and in March only 1. The number of other ophthalmiæ, catarrhal and granular, was at the same time reduced to 10 cases, and the epidemic was at an end.

### BRAZILIAN OPHTHALMIA.

Dr. Gama Labo, of Rio, communicates to the "Monats Bl. für Augenheilk:" (March—May, 1866), through Dr. B. Ullersberger, his observations on a peculiar form of ophthalmia seen in the Brazils in debilitated persons, reduced by previous disease, and most commonly in slaves and slave children. The disease has three stages. In the first, the conjunctiva of the globe and lids is bright red, the lids are not swollen, the corneal epithelium is disturbed, and the optic disc is reddened, and, as if covered by a transparent veil. In the second stage the cornea appears normal, the reddened palpebral conjunctiva is studded with little elevations, the ocular conjunctiva is whitish gray, with slight wavy wrinkling of its surface, and with the dull red vessels scarcely visible, except in the reflexions. The nerve disc is no more reddened and sharply defined; and its vessels appear whitish red. The moisture of the eyes has a kind of fatty aspect. In the last stage the conjunctiva is dry, and more strongly wrinkled. In the centre of the cornea is a roundish ulcer, surrounded by a belt of purulent infiltration. The anterior chamber contains pus. The patient keeps the eyes constantly closed. Dr. Gama Labo relates four cases in detail, all of which terminated in death.

### ON SUB-CONJUNCTIVAL INJECTION OF A SOLUTION OF CHLORIDE OF SODIUM, TO PROMOTE THE ABSORPTION OF CORNEAL OPACITIES.

Prof. Rothmund ("Monats Bl. f. Augenheilk." March—May, 1866), has been employing a sub-conjunctival injection of a solution of chloride of sodium (a scruple to an ounce of water) to promote the absorption of the diffuse corneal opacities left behind by parenchymatous inflammation. In six cases he believes that he has obtained more speedy results than any other known means would have yielded. The solution is warmed, and is very slowly injected by a syringe with a curved nozzle, through a puncture about a line and a half or two lines from the margin of the cornea. The immediate effect is to surround the cornea with an elevated ring like that of chemosis. Under a compressive bandage, the swelling disappears in five or six hours, and the resulting irritation in five or six days, after which time the cornea begins to clear from the margin. After three or four weeks the injection may be repeated; and after from three to five injections, the formation of an artificial pupil has been practicable.

### CASE OF HEREDITARY IRIDEREMIA, FROM THE CLINIQUE OF PROF. REUTE.

*Reported by Dr. Paul Schröter* (*Monats. Bl. f. Augenheilk, Mar.—May*, 1866).

In a woman, 42 years old, from Wildenfels, who attributed the state of her eyes to her mother having been frightened by an amaurotic man when pregnant with her. The following condition was observed:—

Both eyeballs small, deeply sunken, and the subjects of alternating squint and of nystagmus. *Right eye:* Cornea small, with diffuse turbidity at its upper margin; iris wanting; lens with lamellar turbidity, small central opacity, and lamellar streaks. With a 12-inch concave, No. 17 was read at 12 inches. *Left eye:* Cornea small; iris wanting; anterior capsule white and densely opaque, except at one outer portion, through which turbid lens substance could be seen. Fingers could only be counted when very near. The opacity of the lens had shown itself only a few weeks previously. In early childhood the sight was very imperfect, but it improved whilst at school, so that small print could be read, and there was at the same time good distant vision.

This woman had two children, and the eldest, a girl seven years and a half old, was born with the same deficiency. In this child the whole corneal circle appeared perfectly black. The experiment of Purkinje gave only the first (erect corneal)

image; but the margin of the lens could be distinguished with the ophthalmoscope. The absence of the image from the anterior surface of the lens was due to this surface, in irideremia, being in contact with the cornea. The image from the posterior surface was wanting in both eyes, on account of some turbidity at the posterior poles. In the anterior chamber of the left eye there floated a white thread-like body; the characters of which could not be ascertained, on account of the great nystagmus. The child was not dazzled, and saw large objects well; but small ones with obvious difficulty, and only in a good light. Both mother and child were subject to attacks of headache.

## CASES OF ISCHÆMIA OF THE RETINA.

*By Prof. Rothmund* (*Monats. Bl. f. Augenheilk, Mar.—May*, 1866.)

A healthy country girl, 18 years old, in service, had observed, six days before, that all objects became suddenly obscured, and, on the next day, she became perfectly blind. Externally there was nothing noticeable beyond extreme dilatation of the pupils. The central artery of the retina was very small at its point of emergence, and its peripheral branches were completely empty. The veins were dark and also somewhat narrowed. No pulsation could be produced by pressure. The face was flushed, pulse full, heart sounds normal; there were noises in the ears, and feeling of heat in the head. A derivative treatment was employed (leeches, sinapisms, footbaths, and calomel). After three days the patient could see the movements of a hand with the left eye; the right remaining blind. After nineteen days, in which no improvement took place, paracentesis corneæ was performed on the right eye. On the following day she could count fingers with the right eye at six inches; and, after three days, at eighteen inches. The action of the pupil was also restored. Paracentesis was then performed on the left eye; with which, nine days later, the patient read No. 17. From this time the sight steadily improved, on the left side more rapidly than on the right; and at the end of eight weeks the retinal arteries were naturally filled, and vision on both sides was perfect.

The second case was in a girl of 13. The history is only that she is very anæmic, but otherwise healthy, and that she became suddenly blind four days before being brought for treatment. With the right eye fingers could be counted at four inches; with the left there was only quantitative perception of light. The retinal arteries on both sides were empty. Paracentesis was performed on both eyes; and, on the following day, fingers could be counted with both at four feet. In eight days there was no further improvement, and the paracentesis was repeated.

From this time the sight mended daily, and was quite restored in eight weeks.

The author observes that in this affection the operative treatment, first advised by Alfred Graefe, and decidedly the only trustworthy method, is only serviceable when the anæmia of the retina depends on a mechanical cause. In two other cases he performed paracentesis and iridectomy without result, although the retinal vessels were quite empty. But, in one of these cases, subsequent events showed the presence of a tumour in the brain, and in the second, the anæmia of the central artery was only the first step in degeneration of the retina dependent upon Bright's disease.

### ON A PLANO-CONVEX LENS, WITH MEASURING SCALE FOR OPHTHALMOSCOPIC INVESTIGATION.

*By Dr. Colsmann.*

Dr. Colsmann has published (Deutsch. Klin. 1866) a report of his ophthalmic hospital at Langenberg, near Elberfeld. It contains nothing of special interest, except an account of his use, for ophthalmoscopic investigation, of an object glass of two-inch focal length, plano-convex, and with a scale of millimetres on its plane surface. Holding this lens in the ordinary way, two inches from the eye of the patient, he finds it easy to make any part of the inverted image coincide with the scale, and the measurements thus afforded supply a ready test of the state of the refraction. When the eye of the observer is distant from six to nine inches from that of the patient, the image of the optic disc of an emmetropic eye has an apparent diameter of from five to seven millimetres. The image of the disc of a myopic eye has an apparent diameter of from two to three millimetres, and that of a hypermetropic eye from nine to ten. This great apparent enlargement of the disc is especially manifest in elderly hypermetropic people, in whom the error of refraction is not concealed by accommodation.

### CASES OF HEMIOPIC CONTRACTION OF THE FIELD OF VISION.

*By Dr. Gunning.*

Dr. Gunning, in a report of his ophthalmic hospital at Amsterdam (Nederl. Tijdschr. v. Geneesk. II., 1865), describes the following cases :—

In a woman 52 years of age, who had had an attack of apoplexy nine weeks previously, and had recovered from the resulting paralysis of the left side, vision was totally lost in the inner half of the field of the right eye, and in the outer half of

the left. The vertical line which sharply defined the defect, was situated in the right eye inwards, in the left outwards, of the yellow spot. Central vision was retained, but the patient could only find her way about with difficulty.

The second case was in a man 50 years old, who was attacked with intense headache in the street eleven years previously, and who then, although he did not lose consciousness, could not find his way home. When seen by Dr. Gunning he had no ailment beyond some dullness of perception, and loss of the right half of the field of vision in both eyes. In the lower quarter of the defective regions there was still some perception of light.

In neither case could anything abnormal be discovered by the ophthalmoscope.

### MR. MARSON ON VARIOLOUS OPHTHALMIA.

Mr. Marson, our chief English authority in all which relates to small-pox, gives us some very interesting information on variolous ophthalmia in his admirable article, just published in Reynolds's System of Medicine. He states that in 1838, having then seen upwards of 1,500 cases of small-pox, he had never once witnessed the formation of a pustule on the eye. Since that date, however, he has several times seen them. Out of 15,000 cases treated at the Small-pox Hospital during thirty years, the formation of a primary pustule in the eye was observed only in thirty-six instances, and in not one of these was the eye in any way injured. The explanation of the immunity from bad results is, that the pustule occurs on the thickest part of the conjunctiva, and never on the cornea. Its usual position is midway between the cornea and the inner canthus, sometimes near the outer canthus.

The ulcers of the cornea occurring in connection with small-pox, never take place during the development of the eruption. They occur during the stage of secondary fever, sometimes as early as the tenth day, sometimes as late as the thirtieth, most frequently at about the fourteenth. These dates are calculated from the commencement of the eruption. The ulcer usually forms at the margin of the cornea, and spreads with greater or less rapidity in proportion to the severity of the secondary fever.

Sometimes ulceration commences simultaneously at opposite parts of the cornea, and when this is the case it spreads very rapidly, and the eye is almost inevitably lost. Occasionally the entire cornea may be swept away within forty-eight hours of the apparent commencement of the ulceration, and now and then this goes on without causing any inconvenience to the patient.

"This destructive ulceration never goes on rapidly but when there is a high degree of secondary fever present. That is a point which should be particularly remarked. It is likely to occur when there is a hot and dry state of skin, rapid pulse, thirst, loaded tongue; these having been preceded by a very confluent state of the disease, and the patient has just escaped dying at the usual time, namely, the ninth, tenth, or eleventh day of the eruption. Then it is that some serious consequence may be apprehended, such as the loss of an eye, formation of large and deep abscesses, sloughing of the cellular membrane, or may be formation of matter in one side of the chest. Some of these serious results may be expected when the secondary fever runs high in confluent small-pox, combined with the circumstances above detailed."

Mr. Marson also mentions that conjunctivitis, rather slow in its progress, begins in the course of a tedious convalescence as late as the third or fourth week, and with it there may usually be found a small central ulcer on the cornea. He makes no mention of iritis.

## THE DYNAMIC ANOMALIES OF THE LATERAL MUSCLES OF THE EYE AND OF THE ACCOMMODATION.

*Lecture delivered by Prof. v. Graefe, at the Clinique of Dr. Giraud-Teulon, and reported by M. Delfau* (*Gaz. des Hôp.* 29*th Nov.* 1866, p. 550. *Annales d'Oculistique*, vol. 56, p. 318).

One of the most important points in the practical study of the impairments of associated vision, and one of the most embarrassing to the surgeon, is the recognition and determination, in every case, of the mutual relations which connect the convergence of the optic axes, and the accommodation of each eye. It is, therefore, of some interest to examine the practical means of investigating these relations.

Direct binocular fixation and exact accommodation are subject to some anomalies, and in some patients, for example, these functions are accomplished with an excess of force.

In dynamic divergent strasbismus direct binocular fixation is possible for every distance; but only by an exertion of muscular power.

1. Take a patient in whom the near point is at two inches, and the far point at infinity. If prisms, with their bases outwards, are placed before his eyes, he will still have distinct vision, but only by a muscular effort on the part of the internal recti. He is in the same position with a patient in whom the lateral muscular equilibrium is destroyed; that is to say, who suffers from *dynamic divergent strabismus.*

2. Take another person, with a perfectly normal eye, and place before it a concave lens. He will still be able to see from

infinity to about four inches, but only by an effort of accommodation. Certain patients fulfil pathologically the conditions of this experiment, and the two foregoing types were taken by the Professor as the subject of his lecture.

I.—*Failure of Equilibrium of the Lateral Muscles of the Eye.*

*Diagnosis.*—There are two means of detecting loss of equilibrium of the lateral muscles. The first is to bring a small object, as the point of a pencil, to within two inches and a half or three inches of the eyes, and to direct the patient's attention to it. It will be observed that the convergence of the eyes is accomplished with an effort, and that the patient has a tendency to draw back in order to require a less degree of convergence. Then, if we place a hand so as to conceal the object from one eye, that eye will deviate outwards, placing itself in a state of divergent strabismus.

The second means is by placing before one eye a prism with its base superior, when the difficulty of convergence will be increased.

Prisms, however, are of much utility when the insufficiency is not very great in degree. They may be worn of three or four degrees on each side; but the actual remedy is tenotomy.

II.—*Excess of Accommodative Power.*

At present we recognise faults of accommodation by two methods:—

1. By the state of the refraction;

2. By the absolute latitude of accommodation. To these Professor v. Graefe would add:—

3. The relative latitude of accommodation. The first two means furnish certain data; but they do not discover whether the patient makes an effort of accommodation at the distance at which he works. Professor v. Graefe proposes the following test. If a patient is exerting an effort of accommodation at eight inches, and we cover one of his eyes, the eye that is covered will make a movement of convergence. Prisms with their angles superior or inferior will display this convergence; just as, in loss of the equilibrium of the lateral muscles, they display the dynamic divergence. In the former case (convergence) the double images would be crossed; in the latter, homonymous.

This method is sometimes imperfect, and should be combined with a measurement of the amount of accommodation that the patient is exerting.

But, on placing a convex glass before the eye, a less amount of accommodative force is called forth; an amount correspond-

ing to the strength of the glass being put in reserve. On employing, on the contrary, a concave glass, an effort of accommodation proper to counterbalance its dispersion is called forth.

This being so, having ascertained the strongest convex and the strongest concave lens through which a patient can see distinctly at a given distance, we have the accommodative force that is put in reserve, and that is brought into play. This is the relative latitude of accommodation.

For clinical examination Franklin's glasses are convenient. They consist of two half lenses in juxta-position along a horizontal line. They may be + 20 and − 20; or even 7, 6, or 5.

In near vision one eye is excluded, in distant vision both are used, but by straining the internal recti.

It is precisely because the patient is obliged to make an effort with the internal recti that he would require a stronger concave glass.

Finally, as regards the refraction, we observe, in such cases, an exaggeration called dynamic refraction; emmetropia may simulate myopia.

4. The worst consequence is the increase of the myopia. Under such conditions we see, in fact, that the myopia has a progressive course. Its progress has been attributed chiefly to the movements of convergence, which produce compression of the eyeball and choroidal congestion. Professor v. Graefe does not deny this cause; but he does not think it the chief one. It is not the normal convergence which chiefly augments the myopia, but the abnormal, or exaggerated. It is this which constitutes the gravity of myopia.

In 32 myopes, Professor v. Graefe has cured the defect of equilibrium, and in only two of these cases has the myopia afterwards increased. In the other 30 it remained stationary.

*Treatment.*—The defect of equilibrium may be treated by three methods:—

1. By acting upon the muscles (tenotomy).
2. By acting upon the accommodation by concave glasses.
3. By acting upon the convergence by prismatic glasses with the bases inwards.

Of the two last means, the only effectual one is usually the employment of prisms, which remove to a greater distance the virtual crossing of the optic axes, relieve the adduction, and thus re-establish the harmony between the powers of accommodation and convergence.

With regard to concave lenses, they are inconvenient by diminishing the retinal images, 1st, by the greater distance to which the object is removed; 2nd, by their own optical properties. This defect often destroys the benefit of the use of concave lenses for short distances; the patient, notwithstanding all

advice, having an invincible tendency to bring objects close, in order to obtain larger retinal images.

With respect to this, the concave glasses may become a motive for placing a prism with its base inferior before one eye, so as to produce diplopia. If the eye be normal, the two images will be one above the other on the same vertical plane. If, on the contrary, the eye suffers from a defect of muscular equilibrium, the images, still one above the other, will also be separated laterally. The degree of the lateral separation is the measure of the defect of equilibrium.

We must here remember that there is a relation between convergence and accommodation. A certain convergence corresponds reciprocally to a certain accommodation. In acting upon the accommodation by glasses, we act also upon the convergence. A concave glass requires that the accommodation should become greater in order to counteract the greater dispersion of the rays of light.

It follows that, in many patients, the presence of a concave lens before the prism nullifies the action of the latter, and restores the laterally displaced images to their vertical superposition. This is easily understood. The excess of accommodation required by the presence of the concave glass acts secondarily upon the convergence.

*Consequences.*—The defect of equilibrium of the lateral muscles entails many consequences.

1. *Muscular asthenopia.* The internal recti being fatigued by excess of work.

2. *Neuralgic sensations.* Such as orbital pains, vertigo, nausea, &c.

3. *Various apparent disorders of refraction.* Together with the defect we may doubtless sometimes find emmetropia, but one of the most constant phenomena is apparent myopia. It is discovered on seeking the far point for binocular vision. There is then an apparent myopia, because the patient is unable to relax his accommodation beyond a certain point nearer than infinity, and that corresponds to the condition of his static refraction.

Moreover, we often find an apparent exaggeration of a myopia actually existing. For example, a patient whose far point, for No. 1 of Jaeger, is at eight inches, will be able to read with a lens of $-\frac{1}{8}$, or weaker. When he has defect of equilibrium of the lateral muscles, he requires + 40 and — fixed in the same mounting. The surgeon need not change the glasses to determine the state of dynamic refraction of his patient, but judges from his account of the distance at which they enable him to read.

In some emmetropes there is always an effort of accommodation, even for distant vision. Some persons, in fact, employ three-fourths of their power of accommodation, while others scarcely employ one-tenth.

Professor v. Graefe considers that the energy of accommodation is represented by the accommodative force that the person is able to exert. Thus we may meet with hypermetropic eyes in which the error of refraction is concealed by great accommodative power, and which never suffer from asthenopia.

*Treatment.* The treatment may be directed to the accommodation, to the muscles, or to the refraction.

1. The accommodation may be reached in an indirect manner, by using prisms with their angles inwards, which leave at the disposal of the patient a greater power of accommodation for any given distance.

2. The muscles may be treated by tenotomy. Professor v. Graefe has practised this.

3. The refraction may be modified by convex glasses. These diminish the accommodative effort, so that they may enable a patient, in fact, to use only half of his relative accommodation instead of the whole.

The choice of glasses calls for certain precautions:—

If the accommodation is limited, the use of prisms with their angles internal would be injurious. It is inconvenient to bring the far point too near; and, by doing so, we cause fatigue and headache.

On the other hand, some persons are in the habit of always exerting their accommodation, and cannot read, for example, if it be relaxed. In such cases glasses which require relaxation of the accommodation (convex glasses) cannot be borne immediately. In this respect, therefore, certain precautions must be observed.

To these inconveniences must be added also the question of excentric vision through spectacles; a neglected subject to which Professor v. Graefe intends speedily to call attention.

*Conclusions.* From the foregoing we may conclude that defect of equilibrium of the lateral muscles of the eye, as well as defect of equilibrium of the accommodation, impedes the functions of the eye, and may even injure its integrity.

The analysis of these matters should, therefore, be an object of care to the surgeon; and an exact knowledge of them is even more necessary than the determination of the state of the refraction, which, taken alone, leaves the history of the case obscure and incomplete.

## THE TREATMENT OF CONICAL CORNEA.

*v. Graefe* (*Arch. f. O.* xii, 2, pp. 215—222),

After a glance at the methods hitherto employed for treating this condition, mentions that it occurred to him to excite ulceration and cicatrization in the centre of the diseased cornea. It is

known that such a process will produce flattening of a cornea previously of normal curvature; and v. Graefe believed that the same action would be even more pronounced in an abnormal one. Patients with central leucoma in a normally curved cornea usually have much better vision, after a peripheral iridectomy, than is found in conical cornea of a high degree, in which vision often sinks to $\frac{1}{30}$, $\frac{1}{40}$, or even less.

The plan thus suggested was put in practice in the case of Frau. O., 43 years of age. She stated that the sight of her right eye had been very imperfect since childhood; but that the left, although somewhat short-sighted, had had good vision until four years ago. Since then it had gradually and steadily failed, without inflammation, but with some irritability from light. On the 30th of May examination discovered a high grade of conical cornea in both eyes, in the right more than the left. Especially the central regions of the corneæ had assumed the form of pointed cones, of which the apices presented greyish opacities as large as pins' heads. The ophthalmoscope showed moderate ectasia posterior, and excessive irregular astigmatism. Vision is so bad that the patient finds her way about with difficulty. With the right eye she deciphers 16 Jaeger at an inch and a half, but cannot decipher 14; and a stenopaic slit, tried in all directions, is scarcely of any assistance. Excentric vision is also very bad, the patient not counting fingers with certainty in a moderate light. Neither spherical nor cylindrical glasses are useful. In the left eye the sight is somewhat better, the patient reads No. 14, and can be made to read No. 8 by stenopaic spectacles. Selecting the right eye, as the worst, for treatment, in the early part of June, v. Graefe cut away a portion of the central turbid part of the cornea. He made a little flap with a Beer's knife without opening the anterior chamber, and then snipped off this flap at its base with scissors. Two days later the surface of the wound was touched with diluted nitrate of silver, and this cauterization was repeated at intervals of two or three days. The resulting ulcer was perforated in the fourth week with a stilet, and during the next week the closed fistula was reopened every day or every second day. After this it was allowed to heal. The curvature of the cornea was already considerably improved, and also the vision with regard to a general survey of the room. On the 5th of August the patient was discharged, in the following condition. In the centre of the cornea a dense, white opacity, half a line in diameter, surrounded by a slight grey halo, which made the diameter of the whole turbid part slightly exceed a line. At the most cursory glance, but especially by examining its reflections, the improvement in the corneal outline was very visible. The central opaque portion had fallen back almost to its natural position, and the whole membrane departed but little from its proper curvature. The patient read No. 7 fluently at an

inch and a half. The distant vision was $\frac{1}{30}$, but was raised to $\frac{1}{12}$ by a concave cylindrical glass. The clearness of the ophthalmoscopic image was so much increased as to render it probable that vision would have been still better but for the co-existence of a certain degree of amblyopia; and v. Graefe observed that during the last two weeks of the patient's stay, although the cornea continued to clear, there was no corresponding improvement in vision. The left eye will hereafter be treated in the same manner, and the final results carefully noted.

The suggestion to make artificial ulcers for the cure of a morbid ectasia is not new; but it is new, as far as v. Graefe can ascertain, in cases of conical cornea.

### EXPERIMENTAL CONTRIBUTION TO THE STUDY OF GLAUCOMA.

*By Dr. Wegner* (*Arch. f. O.*, vol. xii, 2, pp. 1—22).

In the course of 1866, four cases of neuralgia of the trigeminus, complicated with simple glaucoma, came under the observation of Professor Horner of Zurich, who was led to believe that there must be some relation of cause and effect between the two disorders. He requested Dr. Wegner, then at Zurich, to institute certain experiments. They were carried on in the laboratory of Professor Dubois Reymond, and with the assistance of Dr. Rosenthal. Dr. Wegner begins his paper by a detailed account of two of the cases, and refers in a note to two similar cases already recorded by Mr. Hutchinson, in vols. iv and v of the Ophthalmic Hospital Reports. He then proceeds to say that, in endeavouring to ascertain the influence of certain nerves upon the vessels, and upon a transudation from them increasing intraocular pressure, the first step was to determine by what nerves the vessels were supplied. In many young white rabbits the blood-vessels of the iris are perfectly open to observation, and display a considerable breadth, although in older rabbits they are so much covered by the epithelium of the iris as to appear only as lines. With regard to the vaso-motor supply of the iris, authorities differ. Claude Bernard, and those engaged like him, in the study of the nerves of vessels, seem, with the exception of Schiff, to have made no direct observations on the point. Some have assumed that the cervical sympathetic supplies the vessels of the eye, as of the other parts of the head; while Schiff, Funke, and others, declare the trifacial to be the only nerve of the internal ocular circulation, and that the vessels of the iris are independent of the sympathetic. To decide the doubt, the following experiments were tried:—

I. The cervical sympathetic of a young white rabbit was divided on one side. The vessels of the iris on that side immediately enlarged, the iris became hyperæmic, with small extrava-

sations here and there. The upper end of the divided nerve being irritated, the vessels contracted until they were empty; the iris becoming white and bloodless. The irritation ceasing, the hyperæmia returned.

II. The trigeminus of one side being divided, the vessels of the iris became dilated, as in the former experiment. Irritation of the sympathetic produced no contraction.

III. The trigeminus being divided on one side, and the cervical sympathetic on the other, the hyperæmia of the iris was alike on both sides. In many instances, however, the congestion was at first greater, on the side of the trigeminus section, than on that of the sympathetic section. This could be explained on the ground that the division of the trigeminus involved some hyperæmia of the brain, by which the ocular circulation was influenced. Very soon, however, this excess of congestion subsided, and the two eyes remained in the same condition.

From these experiments Dr. Wegner concludes that the vaso-motor nerves of the iris are wholly derived from the sympathetic, but that they pass into the trunk of the fifth, and are carried by it to the eye, as well as divided when it is cut through. In the cranium they seem to lie on the inner side of the fifth, for in one case the section of the latter was incomplete. The vaso-motor nerves were divided, and the cornea and conjunctiva deprived of sensation, but the other parts supplied by the fifth were unaffected. It was afterwards found that only quite the inner portion of the nerve had been cut through. The ophthalmoscope appeared to show that the vessels of the choroid and retina were affected in like manner with those of the iris.

The innervation of the vessels of the iris having been determined certainly, and that of the vessels of the choroid and retina with probability, the next step was to devise a means of accurately determining and measuring the variations of intra-ocular tension. For this purpose a small conical canula was pushed into the anterior chamber near the outer margin of the cornea. The smaller end of this canula was a solid point, above which was a lateral opening, and the larger end was fitted with a fine stop-cock; above this was fastened to the canula a tube composed of alternate portions of india-rubber and glass, filled with a solution of common salt. This tube made a communication between the canula, and through it the anterior chamber, and a manometer fitted with a capillary mercurial scale. It is unnecessary to describe Dr. Wegner's account of the various precautions required to avoid erroneous conclusions. His experiments seem to have been conducted with due caution. He found that in different rabbits the degree of intraocular pressure varied within rather wide limits, as from 18 to 35 millimetres of mercury; and he found also that a large iridectomy in one

eye, after a lapse of sixteen days, and complete healing of the wound, invariably reduced the pressure of the eye operated upon, as compared with the other eye of the same animal, by 6 or 7 millimetres.

The working of the instrument having been thus tested and mastered, the cervical sympathetic was laid bare, and the canula introduced into the eye. As soon as the mercurial scale was at rest, the sympathetic was divided. This was done repeatedly, and the pressure was always diminished from 4 to 8 millimetres, the mercury sinking gradually. At the same time trials were made to discover the effect of atropine on intraocular pressure. In many experiments it was always found that atropine, whether applied locally or given internally in corresponding quantities, considerably diminished the tension of the globe. It might hence easily be inferred, if the dilatation of the vessels by section of the sympathetic diminished tension, and the effect of atropine was also to diminish tension, that atropine must exert a generally paralysing influence over the vaso-motor nerves. The diametrically opposite statements of Fleming, Jones, and Hayden, did not deter Dr. Wegner from pushing this inquiry. He injected half a cubic centimetre of a solution of one part of atropine in one hundred parts of water under the skin of the ear of a rabbit. In a short time the vessels of the ear became distended, its temperature elevated between two and three degrees (Cent.) above that of the other ear, and irritation of the cervical sympathetic produced little or no effect in contracting the vessels; so that the peripheral extensions of the nerve-fibres, or the muscles of the vessels themselves, were paralysed by the atropine. Persons examining the rabbit, and not knowing what had been done, believed that it had been subjected to Bernard's experiment. The same paralysis of the muscular wall of the vessels was observed in the iris after the instillation of atropine.

From this Dr. Wegner concludes that the diminution of intraocular pressure after the section of the sympathetic, and after the use of atropine, is in both cases due to the paralysis and dilatation of the vessels, and that the clinical observation of v. Graefe, "that atropine exerts a tranquillising influence over the nerves of secretion of the eye" is substantiated by exact experiment. He explains the diminution of pressure thus:—The pressure to which the blood is subjected in any artery is the result of two factors—the stroke of the heart and the resistance of the arterial wall. The latter may be divided into two portions, the passive, the elasticity of the arterial wall, and the active, the contraction of the arterial muscles. The latter forms no inconsiderable part of the whole, and, if arrested, the pressure of the blood is diminished. This diminution is shared by the general pressure, in a manner more or less marked according to the degree of extension of the muscular paralysis. Shortly after the

paralysis of the arterial muscles, the blood would flow in unusual quantity along the dilated channels, and the capillaries would be distended, at first under increased pressure. This would soon cease, the capillaries being neither elastic nor contractile, and opposing no resistance. The blood would soon, in the whole region of the paralysed artery, flow through dilated channels under diminished pressure.

An experiment of another kind gave additional evidence of the change produced in the ocular tension by section of the sympathetic. After the nerve was divided on one side in a rabbit, a traumatic iritis was excited in both eyes at the same time by similar injuries. It was evident to the most unpractised observers that the eye on the side of the section was far less hard than the other, and the difference was also shown by the manometer.

It was evident that section of the trigeminus would have necessarily the same influence, with regard to tension of the eyes, as section of the sympathetic, since the vaso-motor nerves of the choroid and iris would be divided in either case. Moreover, Cl. Bernard and Donders have already remarked that, after section of the trigeminus, and prior to the occurrence of inflammation, the eye on the side of the section is considerably softer than the other.

Since the ocular tension is diminished by paralysis of the vaso-motor nerves, it would probably be increased by irritating them. Dr. Wegner found it extremely difficult to bring this to an experimental test. In four trials, the results were twice negative, and twice an increase, for a short time only, of from 1 to 2 millimetres. The case is very different where there is pathological irritation without operative interference, especially when a somewhat slight irritation is long continued. Dr. Wegner thinks himself authorized to conclude that the normal intraocular pressure is regulated by the sympathetic filaments that supply the vessels of the iris and choroid, and that, as the essence of glaucoma and the starting point of all its phenomena is to be found in increased tension, so the cause of glaucoma must be sought in a pathological irritation of the sympathetic fibres of the eye, either idiopathic or reflex in its character.

Returning to the recited cases of neuralgia complicated with glaucoma, Dr. Wegner expresses his belief in a causal connection between the two diseases, and suggests for this three possibilities. Either the filaments of the sympathetic shared in an inflammatory process, or they were irritated by pressure, or by reflex action through some fibres of the trigeminus proceeding from the interior of the eye. The possibility of the last event was shown by the following experiment:—

The posterior auricular nerve of a rabbit was exposed and divided, and the hyperæmia and elevation of temperature, de-

scribed by Schiff, were produced. The central end of the nerve was irritated, and both ears were observed. With evidences of acute pain, the arteries of both ears became contracted to complete disappearance of their calibre. The contraction was maintained while the irritation continued, and was soon followed by complete dilatation when the irritation ceased. All reaction of the vaso-motor nerves to irritation was stopped by section of the cervical sympathetic. The same results were obtained in the ear when the irritation was applied to the temporo-auricular branch of the trigeminus, or to the peripheral terminations of this nerve in the lip or the conjunctiva; and in the eye, by irritation of the central end of the supra-orbital nerve.

It would therefore appear that the vaso-motor, like the sensitive and the musculo-motor nerves, may be excited by reflex action from various points of the surface. Their centre of reflex action is probably in the spinal cord. Yet in many instances the arrangements seem to be such that only a local reflex action of the vaso-motor nerves follows from sensible irritation. In one case observed by Dr. Wegner, irritation of the posterior auricular nerve only produced contraction of the arteries of the ear on the same side, on whichever side it was practised. It must be conceded, therefore, that the glaucoma under consideration may have been produced by reflex action through the fifth nerve.

The fact of a reflex excitation of the vaso-motor through the sensitive nerves seems not to be unimportant with reference to many well-known phenomena; such as the pallor or redness produced by mental emotion. It will also help to explain many things both in general and in ophthalmic pathology, such as amaurosis occurring during neuralgic paroxysms, the recurrence of iritis from pupillary adhesions, and the occurrence of sympathetic ophthalmia.

### BROWN CITRINE OINTMENT IN THE TREATMENT OF TARSAL OPHTHALMIA AND PHLYCTENULAR CONJUNCTIVITIS.

Dr. E. Williams (Cincinnati), in the Transactions of the American Medical Association, speaks in the highest terms of a *brown citrine ointment* in the treatment of these troublesome affections. He thinks it more efficacious and less irritating than Pagenstecher's ointment of precipitated yellow oxide of mercury. All crusts being first softened and removed from the eyelashes, and the eyelashes cut close if necessary, the ointment should be gently applied to the tarsal margins with the pulp of the finger, in most cases every night. If it occasion swelling, it should only be applied every other night. In cases of phlyctenulæ it may be applied, as other ointments, with the point of a camel's hair brush. Its use should be continued, once or twice a week, for

some little time after recovery, in order to prevent relapse; and it may also be applied, with great benefit, to the eruptions of the face and head with which the ocular affections in question are often associated. When there is much general conjunctivitis, Dr. Williams uses also a lotion, containing four grains of sulphate of morphia, and half a grain of sulphate of copper or of zinc, to the ounce of distilled water, to be used three times a day. If there be much photophobia, he precedes the application of the ointment by the instillation of a solution of atropine, using one grain to the ounce of water for children from one to five years old, and two grains to the ounce for children above five years. These solutions are applied from three to six times in the twenty-four hours; and quinine is also given in full doses, as one or two grains three times a day. If this method does not speedily diminish the photophobia, he combines opium with the quinine, giving from half a grain to a grain for a dose. As soon as the acute symptoms are at all diminished, the ointment is applied. In less severe cases the ointment is used from the first, with the aids of good diet, regular exercise, and tonics. All forms of counter-irritation are rigidly abstained from. The ointment is the citrine ointment of the United States' Pharmacopœia, but made with cod liver oil instead of lard and neat's foot oil. The first product is granular, but being kept over the fire, and thoroughly melted, and then stirred until cold, a perfectly smooth, soft homogeneous ointment, of a rich mahogany brown, is obtained.*

### ON THE MECHANISM OF THE PRODUCTION AND DEVELOPMENT OF POSTERIOR STAPHYLOMA, AND ITS CONNEXION WITH INSUFFICIENCY OF THE INTERNAL RECTI.

*Memoir presented to the Imperial Academy of Medicine, Nov. 27th,* 1866. *By Dr. Giraud-Teulon.* (*Annales d'Oculistique, Nov. and Dec.,* 1866.)

It is well known that confirmed myopia is accompanied, among other symptoms, by two anatomical characteristics: 1. Progressive atrophy of the choroid; 2. Ectasia of the posterior coats of the eyeball, known as *posterior staphyloma.*

The myopia itself, which depends upon an elongation of the antero-posterior axis of the globe, is, in reality, a consequence of the ectasia.

It is intended, in the sequel, to study the mechanism which produces this ectasia, this elongation of the eyeball, this gradual change of its shape from a sphere to an ovoid. For this purpose

* The United States formula is, "Hydrargyri ʒi, Acidi Nitrici f. ʒxi, Adipis ʒiv, Ol. Ped. Bov. ʒix." Dr. Williams does not refer to the great value of the compressive bandage in phlyctenular cases. Whatever treatment is adopted, the bandage should not be omitted.

we have first to consider the anatomy of the part of the eye in which the change commences.

The sclerotic, at the posterior region of the eyeball, is composed of two layers, separated by a delicate, but appreciable, zone of connecting tissue, which forms a somewhat narrow disc around, and a little posterior to, the lamina cribrosa. The neurilemma of the optic nerve is composed of two layers like those of the sclerotic, also separated by connecting tissue. Of these layers, the internal becomes intimately blended with the lamina cribrosa, with the choroid, and with the inner layer of the sclerotic. The exterior layer of the neurilemma blends with the exterior layer of the sclerotic, and the intervening cellular tissue is continuous from one to the other organ.

All observers have remarked that the beginning of posterior staphyloma is indicated ophthalmoscopically by the appearance of a small whitish crescent at the outer border of the optic disc, generally in the horizontal plane. This crescent gradually increases in width along the horizontal meridian, its points embrace an ever-increasing portion of the disc, and it is ultimately met by a similar crescent, commencing on the inner border. The two become blended, and form an elliptic or circular zone around the point of penetration of the optic nerve.

Pathological anatomy then discovers that this zone is formed by the gradual distension, thinning, and, finally, atrophy of the choroid and the inner layer of sclerotic. The outer layer of sclerotic ultimately yields to pressure and recedes, forming a vesicle or distinct elevation. At the same time with these occurrences the eyeball becomes unduly tense. Sometimes the retinal veins pulsate spontaneously, and are more or less engorged or varicose. Lastly, the eyeball assumes a form manifestly ovoid, its long axis being antero-posterior.

This ectasia, or posterior staphyloma, with the myopia that it occasions, are generally the results of prolonged employment of the eyes about near objects. Hereditary myopia in young children, who have never exerted the eyes in near vision, is never accompanied by ectasia, although the latter condition is speedily produced when the eyes are so exerted.

We have therefore to determine what is the connection between exertion of the eyes upon near objects, and the production of a certain anatomical change. In the first place, in near vision what forces are called into play? Manifestly two, accommodation and convergence.

The myopic eye, however, has very little need of accommodation, and would rather relax than exert it. It remains to examine the phenomena of convergence.

The eyeball is suspended in equilibrium between two groups of muscles, the recti and the obliqui. Whether at rest or in motion this equilibrium is regulated by a law which has for its

object the maintenance of the spheroidal form of the globe. Upon this the accuracy of vision depends. When the eyeball moves in any direction, the muscles that contract to accomplish the movement would increase the internal pressure of the globe, and would thus distort its shape, if their antagonists did not relax in proportion. This principle, which must be borne carefully in mind, was laid down by M. Jules Guérin.

In simple convergence, on a horizontal plane, the axis of movement is the vertical axis of the globe, and the muscle in contraction is the internal rectus. The fulcrum is the surface of the spherical lever that is set in motion.

This granted, we may see that the contraction of the internal rectus tends to draw backwards its point of scleral insertion (and would therefore, if alone, simply pull back the whole eyeball). The resistance of the obliqui and of the rectus externus keeps the eyeball in its place, and compels it to turn upon its axis, producing adduction of the cornea. In this movement the point of insertion of the obliqui moves in an opposite direction, that is, from behind forwards, and from within outwards, for the same distance that the insertion of the internal rectus moves inwards and backwards. The insertion of the external rectus makes an equal movement forwards and inwards. Moreover, in proportion to the degree of convergence, the globe, by reason of its shape, tends to stretch the obliqui; an action that must manifestly be attended by an equal reaction on their parts, increasing internal pressure. The simple physiological movement of convergence on a horizontal plane necessarily produces therefore a tendency to increased intraocular tension. This tendency is much more manifest when the movement of convergence, as in most of the occupations of civilized life, is in a plane directed from above downwards, and from behind forwards. In § 9 of *Leçons sur le strabisme et la diplopie*, I have analyzed the influence of the elevation or depression of the plane of convergence upon the degree of intraocular tension.

When, for distant vision, the optical axis of one eye is directed downwards and inwards, the vertical meridian of that eye is inclined from above downwards, and from outside inwards. The other eye is parallel with the former, and no exaggerated tension is experienced. In *mutual* convergence it is otherwise: the two meridians remain vertical, and the inclination above mentioned does not occur. In the latter case, therefore, there is a muscle that restores or maintains, on each side, the verticality of the plane of the vertical meridian, and this can only be done by the superior oblique. In convergence upwards, it would be done by the inferior oblique. This special action of the obliqui is highly important, and necessarily increases their tendency to compress the globe; so that, in physiological convergence of the optic axes, we have all the conditions likely to increase the tension of the globe.

Since, however, all civilized eyes are not myopic, we must admit the necessity for some further condition, in order to change the tendency into an accomplished fact. Suppose that the circle described by the obliqui around the globe were a little more distant from the centre than in the normal state, we should then have an evident source of aggravation of the tendency. The farther the circle of the obliqui from the centre, the smaller that circle, and the more the pressure would be increased by adduction of the cornea.

A simple backward movement of the insertion of the obliqui is therefore of itself a dangerous source of increased intraocular pressure, and such an insertion is neither more nor less than the source of the preponderance of the muscles of abduction over those of adduction, of the external over the internal recti, or, as it is commonly called, of *insufficiency of the internal recti.*

Three conditions, of great importance as regards intraocular pressure, may therefore be combined in mutual convergence, two physiological, a third abnormal. The former are—1. The regular increase of the diameters of the circles that should be surrounded by the obliqui; 2. The excess of action imposed upon the superior obliqui in order to maintain the verticality of the axis of rotation of the globe. The abnormal condition is the insufficiency of the internal recti, which directly and rapidly increases the effects of the preceding.

It has now been shewn, therefore, that insufficiency of the internal recti dangerously increases the natural pressure consequent upon convergence. We have still to inquire why this increase is followed by ectasia or staphyloma posterior, and not by excavation of the optic disc as in glaucoma.

The matter is very simple. In glaucoma the excessive pressure originates within the globe, and acts uniformly on all points of its periphery. Doubtless it is the same in the case under consideration, and the pressure from within outwards is the same at all points. This pressure has, however, a point of departure in the ocular membranes. It would not exist unless the sclerotic were pulled from behind forwards, and from within outwards, at the place of insertion of the obliqui, by the very fact of convergence. We therefore have the highly elastic sac of the choroid compelled to assume the form of an ovoid, with its long axis directed forwards and backwards (the direction in which the coats of the eye are the least supported), while the external coat, the sclerotic, is drawn forwards. If we reflect on the anatomical arrangement by which the choroid and the lamina cribrosa, and the internal layer of the sclerotic, are intimately united, it is easy to see that the two layers of the sclerotic will become separated in the region where their union is a matter of simple contact: the region where lax connecting tissue surrounds the circle in which the sclerotic blends with the optic neurilemma. The

scleral boundary of the optic disc will follow the movement of the choroidal boundary from before backwards; while the external layer of the sclera is drawn from behind forwards, and from within outwards. The two layers of the sclera are thus dissociated, and made to glide one over the other. Such appears to be the order of events which superadds posterior staphyloma to insufficiency of the internal recti, when that insufficiency is brought into prominence by the need for binocular vision at short distances.

The opinions thus stated are not merely speculative, but are based upon clinical observation.

There is no ophthalmologist who has not met with persons presenting more or less evident posterior staphyloma, without myopia. Donders himself, to whom is due the belief that staphyloma is pathognomonic of myopia, has observed, even frequently, slight traces of atrophy at the external margin of the disc, and sometimes a complete ring, not only without myopia, but in two cases of hypermetropia. The same kind of experience has directed my attention to the matter, and I have been able, in the course of 18 months, to observe thirty or forty cases that throw new light on this important question. The appended table contains some details of thirty-eight cases, carefully observed, comprising eight of slight myopia, that is, less than $\frac{1}{18}$, and mostly about $\frac{1}{30}$, or $\frac{1}{36}$, twenty of emmetropia, and ten of hypermetropia. Among the eight myopic cases, the myopia was manifestly acquired in two, and in two others it only affected one eye.

In all the patients the external border of the optic disc presented traces more or less marked, but undeniable, of choroidal atrophy or commencing posterior staphyloma. All the patients presented symptoms of insufficiency of the internal recti; demonstrated, after the manner of v. Graefe, by a prism with its angle superior or inferior. The facts set forth in the table, together with the circumstance that myopia of a high degree may exist without staphyloma, appear to justify the following conclusions:—

1. If myopia may generally be referred to the existence or the development of ectasia as its immediate cause, this ectasia is itself the result of causes immediate and remote, or predisposing. The first is employment of the eyes upon near objects; the second insufficiency of the internal recti.

2. Among the diagnostic signs of insufficiency of the internal recti, and as one of the principal of them, it will be necessary to place, for the future, the presence of posterior staphyloma, and especially the presence of slight wasting of the choroid at the outer border of the optic disc. In a word, posterior staphyloma is rather a symptom of insufficient convergence than of myopia; or, rather, myopia and staphyloma posterior indicate insufficiency of the internal recti.

## Table of Cases.

| No. | Description. | Symptoms. | Refraction. | Remarks. |
|---|---|---|---|---|
| 1 | Mlle. X., æt. 16, Pupil Teacher. | Muscular asthen. Insufficiency of Rectus int. | R. Myopia $\frac{1}{36}$. L. Myopia $\frac{1}{24}$. | Double crescent; choroid hyperæmic. |
| 2 | M. X., Commercial Traveller. | Recurrent conjunctivitis. Insufficiency of R. int. | Acuity and range normal. | Staphyloma posterior. |
| 3 | M. X., Magistrate. | Muscular asthenopia. | Ditto. | Ditto. |
| 4 | Mlle. L., æt. 15. | Asthenopia. | Slight latent H. Apparent M. | Ditto. |
| 5 | Mlle. C., æt. 16. | Musc. asth. Bleph. cil. Insuff. of R. int. = 3°. | Acuity and range normal. | Staphyloma and choroidal hyperæmia. |
| 6 | Mlle. M., æt. 13. | Musc. and accom. asthenopia. Ins. R. int. | Slight H. | Staph. post. |
| 7 | M. M., æt. 36, Merchant. | Complex asthen.; nervous affection; insufficiency both of convergence and divergence. | H = $\frac{1}{11}$. | Ditto. |
| 8 | Mlle. M. T., æt. 10. | Double musc. and accom. asthenopia. Insuff. of R. int., amounting to external strabismus. | H = $\frac{1}{9}$. | Ditto. |
| 9 | M. D., æt. 29, Naval Officer. | Asthen. Paresis of accom. Insuff. of R. int. = 6° or 8°. | R. M = $\frac{1}{36}$. L. Normal. | Ditto. |
| 10 | M. M., æt. 67. | Diminished acuity; no lens useful. Insuff. of R. int. | Emmetropic. | Ditto. Tension. Venous pulse. |

| | | | | |
|---|---|---|---|---|
| 11 | M. J., æt. 30. | Crossed diplopia. Insuff. of R. int. to ext. strabismus. | Ditto. | Double staph. post. |
| 12 | M. L., æt. 6½. | Intermitt. strab. diverg., or insuff. R. int. | Ditto, or very slight H. | Ditto. Choroidal hyperæmia. |
| 13 | Mme. M., æt. 46. | Amblyopia R. Apoplexy of macula lutea. Evident insuff. of R. int., notwithstanding the absence of binocular fixation. | L. Manifest H. = $\frac{1}{36}$. | Ditto. |
| 14 | M. B. B. | Mydriasis L. Asthenopia. Insufficiency = 6°. | M. = $\frac{1}{24}$ or $\frac{1}{30}$. | Ditto. |
| 15 | Mme. B., æt. 55. | Musc. Asthen. Insuff. of R. int. | Emmetropic. | Ditto. Venous pulse. |
| 16 | M. C. L., æt. 19. | Musc. Asthen. Insuff. = 8°. | Slight M. Manifestly acute. | Double staph. post. |
| 17 | M. S., æt. 60. | Bleph. chron. Insuff. of R. int. | M. = $\frac{1}{30}$. | Ditto. |
| 18 | M. F., æt. 65. | Asthen. Insuff. of R. int. | Emmetropic. | Ditto. |
| 19 | M. C., æt. 30. | Ditto. | Acuity and range normal. | Ditto. |
| 20 | Mme. V. M. | Ditto. | Manifest H. = $\frac{1}{48}$. | Ditto. |
| 21 | M. T. | Bleph. cil. chron. Insuff. of R. int. | Acuity and range normal. | Ditto. |
| 22 | Mme. X., æt. 66. | Asthen. Insuff. of R. int. | Manifest H. = $\frac{1}{24}$. | Ditto. |
| 23 | Mme. H., æt. 47. | Ditto. | Emmetropic. | Ditto. |
| 24 | Mme. B., æt. 45. | Vertiginous asthenopia. Insuff. of R. int. | R. Myop. = $\frac{1}{24}$. L. Emmetropic. | Ditto. Venous pulse. |

TABLE OF CASES—*continued.*

| No. | Description. | Symptoms. | Refraction. | Remarks. |
|---|---|---|---|---|
| 25 | D., æt. 14. | Musc. asthen. Insuff. of R. int. | L. Emmetropic. R. Myop. = $\frac{1}{18}$. | Double staph. post. Venous pulse. |
| 26 | Mme. X., æt. 75. | Ditto. | L. Acquired H. = $\frac{1}{30}$. R. H. = $\frac{1}{20}$. | Ditto. |
| 27 | Mme. X., æt. 48. | Ditto. | Acquired M. = $\frac{1}{36}$. | Ditto. |
| 28 | M. B., æt. 29. | Hemeralopia. Strabismus diver. = $1\frac{1}{2}$ line. Peripheral field of vision intact. | Acuity normal M. = $\frac{1}{36}$. | Do. Tension increased. |
| 29 | M. Dr. G. | Asthen. Insuff. R. int. | R. Emmetropic. L. Manifest H. = $\frac{1}{30}$. | Increased tension. |
| 30 | Mme. H. | Ditto. | Acuity and range normal. | Staphylomatous crescent. |
| 30B | Her son. | Ditto. | R. Myop. = $\frac{1}{12}$. L. Myop. = $\frac{1}{36}$. | Ditto. |
| 31 | .. | Ditto. Eyeball hard. | Acuity and range normal. | Ditto. Also with internal crescent. |
| 32 | Mme. P., æt. 53. | Asthen. Insuff. R. int. | Manifest H. = $\frac{1}{30}$. | Staphylomatous crescent. |
| 33 | Mlle. J., æt. 26. | Confirmed asthenopia. Divergent strabismus. | R. H = $\frac{1}{8}$. L. Amblyopia. | Ditto. |
| 34 | Mlle. L., æt. 8. | Asthen. Insuff. of R. int. | Emmetropic. | Ditto. |

| | | | | |
|---|---|---|---|---|
| 35 | M. D. | Muscæ volitantes. Insuff. of R. int. *Corrected by prisms.* | Emmetropic. | Ditto. |
| 36 | M. X. | Acuity reduced to $\frac{1}{2}$. Insuff. of R. int. | Myopia = $\frac{1}{18}$. | Ditto. |
| 37 | M. D., æt. 35. | Asthenopia. Insuff. of R. int., amounting to strabismus. | R. Emmetropic. L. Image suppressed. | Ditto. |
| 38 | M. V., æt. 70. | Manifest insuff. of R. int. | Myopia = $\frac{1}{38}$. | Choroido retinitis, atrophy, large posterior staphyloma. |
| 39 | M. H. | Very well marked muscular asthenopia. | H. = $\frac{1}{18}$. | Nothing noticed. |

P.S.—The foregoing paper was already finished, when I had the pleasure of hearing the views of Prof. v. Graefe. In a lecture with which he honoured our clinique, M. de Graefe laid down propositions between which and the foregoing there is a close connection. (See page 370.)

The learned Berlin Professor attributes the progressive increase of myopia to an insufficiency of convergent force, or to a dynamic divergent strabismus; and is sufficiently convinced of the accuracy of this view to propose and employ, as a single means to check the progress of posterior staphyloma, the remedy for divergent strabismus, tenotomy of the external rectus. The preceding pages justify the statement that I was about to enter upon the same path; and I have now a case of extreme myopia, arrived at the period of intermittent divergent strabismus, in which tenotomy of the external rectus suddenly diminished the myopia by $\frac{1}{13}$, or from $\frac{1}{5}$ to $\frac{1}{8}$.

It is only just to recall here the attempts made in 1841, by Bonnet, Cuvier, Philips, Jules Guérin, and others, to apply tenotomy to the treatment of myopia. The results then obtained were questioned; but the present knowledge of ocular refraction will make new trials in the same direction more satisfactory.

## A MODIFICATION OF THE STRABISMUS OPERATION.

*By Dr. R. Liebreich* (*Arch. f. O.* xii, 2, p. 298).

By the present methods of operating for squint, it is possible to obtain a correction of $2'''$ or $2\frac{1}{2}'''$ in adults, of $2\frac{1}{2}'''$ or $3'''$ in children. If the deviation be more than this, two, three, or more operations will be required. The division of the necessary correction between two operations, one for each eye, is productive of certain advantages with regard to symmetry and equality of movement; but the repetition of tenotomy on a muscle that has been previously divided is attended by many evils. It is impossible to foresee whether the effect produced by a second operation will be small or great. The cicatrix of the former section may be imperfectly divided, and may entirely nullify the effect of the subsequent one; or, on the other hand, the complete division of such a cicatrix may require a very extensive operation, which may be followed by divergence and loss of movement, sinking of the caruncle, and all the bad results of the old and now abandoned methods of operation. Urged by these considerations, and desirous to improve the accepted methods of tenotomy, Dr. Liebreich, 18 months ago, entered upon a careful study of the anatomy of the parts concerned.

The ocular capsule, which surrounds the whole eyeball with the exception of the cornea, is composed of two widely different

portions. The posterior portion forms a cup, with a firm smooth internal surface, in which the eyeball moves freely, like the head of a bone in its socket. This cup is perforated by the four recti muscles, and forms, at the line of perforation, a sharply defined ring, so closely adherent to the muscles, that no movement can take place between them. The union between the muscles and the posterior part of the capsule is further strengthened by vaginal processes, which spring from the outside of the capsule, and cover the muscles for some distance in the orbit. Towards the eyeball there are no sheathing processes; but the posterior part of the capsule terminates abruptly at the circle of the muscular perforations; and the muscles, anterior to this circle, are for a short distance completely free from sheaths. Before their tendons reach the sclera, they pass between that membrane and the anterior part of the capsule, and become united to the latter. This anterior portion of the capsule bears to the posterior portion somewhat the relation of a convex cover to a bowl. It is much thinner than the posterior portion, and is very difficult of dissection, since, like the conjunctiva, it rapidly loses its firmness after death.

Following the anterior portion from the anterior pole of the eyeball, we begin with a circular opening the size of the cornea, through which the latter projects. The anterior margin of this opening is united to the sclera; and, in a zone limited by this margin in front, and by the insertions of the recti muscles behind, the sclera, capsule, and conjunctiva are almost immovably adherent. Beyond the boundary of this zone the conditions change. The union between capsule and sclera is broken by the intervention of the muscles; and some loose irregular connecting tissue that here exists between the several structures has possibly furnished the basis of such complicated and fantastic descriptions as those of Guérin. The sheaths said to invest the muscles from their perforation of the capsule to their insertion, and that have been used to explain many matters, have no existence. On the contrary, as already described, the anterior half of the capsule rests on the anterior surfaces of the muscles, and is closely united to them; while the conjunctiva is closely united to the capsule over an irregular zone, the boundary of which, in excentric movements of the eye, is indicated by a wrinkle. Beyond this boundary the union between the capsule and the conjunctiva is much looser. Part of the tissue composing the anterior portion of the capsule is reflected into the eyelids; and the rest is applied to the margin of the posterior portion, which itself sends prolongations to the margin of the orbit.

The foregoing description contains three points of special importance in the squint operation.

1. The union between the muscles and the ocular capsule is double. There is first the circular union between the posterior

part of the capsule and the muscles, strengthened by the sheathing processes. There is secondly the union between the anterior part of the capsule and the muscles beneath it.

2. The conjunctiva is firmly adherent to the anterior portion of the capsule, from the margin of the cornea to the outer edge of an irregular zone. It is therefore indirectly in very intimate connection with the muscles.

3. The caruncle and plica semilunaris rest upon a band that passes from the capsule to the margin of the orbit. The contraction of the rectus internus, in adduction of the eye, stretches this band, and draws with it the caruncle towards the inner wall of the orbit. At the same time the outer edge of the caruncle, and the portion of conjunctiva next to it, are pulled backwards into a wrinkle. This is partly because the conjunctiva moves with the eyeball up to the boundary of the line of adhesion; partly because the muscle, on account of its union with the anterior portion of the capsule, draws this backwards in contraction.

It follows from the first of these three conditions that a displacement backwards of the insertion of a rectus muscle can only be obtained by a displacement backwards of the part of the anterior capsule that covers the muscle. This capsule, if not divided, would retain the severed tendon in its original position. On account, however, of its close adhesion to the muscle it would be very difficult, even if possible, to leave it uninjured; and, even in subconjunctival tenotomy, the capsule must usually be divided to the same extent as the tendon itself. This division of the capsule with the tendon explains how it is that a displacement backwards of the part of the anterior capsule that covers the tendon, as well as of the ring of posterior capsule that is adherent to the muscle, and therefore a displacement of the point of insertion itself, is actually effected. By enlarging the section of the capsule (v. Graefe's separation of lateral processes) the displacement backwards may be somewhat increased, but the second of the three points above mentioned is an obstacle to any considerable increase. The union between conjunctiva and capsule forbids any great yielding of the latter, unless the former also be freely divided. If this be done, we see the effect of the third point. On account of the union between muscle, capsule, and caruncle, the displaced muscle draws the caruncle, plica semilunaris, and divided conjunctiva, so much backwards and inwards that these parts assume, when the patient looks straight forward, the position that is natural to them during extreme adduction. The distance between the plica and the inner margin of the cornea is increased, the portion of sclerotic visible at the inner side of the eyeball is enlarged, and the eye assumes the deformity of aspect characteristic of the old methods of operation. To obviate these evils, and to obtain any desired amount of result from a single operation, Dr. Liebreich proceeds as follows:—

*For tenotomy of the internal rectus he lifts with forceps a fold of conjunctiva over the lower end of the insertion of the muscle, and divides this fold with scissors. He then carries the scissors through the wound, between the conjunctiva and the capsule, and carefully separates these structures as far as the plica semilunaris. The plica and caruncle are also to be separated in the same manner from the parts beneath them. After thus rendering the portion of capsule to be divided entirely free from the superficial structures, the tendon is taken up and cut through in the ordinary manner, and the perpendicular division of the capsule is enlarged, upwards and downwards, to an extent corresponding with the amount of displacement that is desired. Finally, the conjunctival wound is brought together by suture.*

For the external rectus a similar operation is performed, in which the conjunctiva must be separated from the parts beneath as far as to the point that is drawn directly backwards in extreme abduction.

For these proceedings Dr. Liebreich claims the following advantages over former methods :—

1. *A greater freedom and a far greater range of effect.*
2. *Avoidance of a depressed caruncle or an unsightly cicarix.*
3. *Avoidance, in every case, of more than two operations, that is, of more than one on each eye.*

With regard to the first of these, it is possible to obtain either the effect of an ordinary tenotomy or a correction of 4‴ or more in adults, and of 5‴ or more in children. Dr. Liebreich disclaims, however, the practice of tenotomy on one eye only in very extreme squint, and follows v. Graefe in preferring to divide the effect between both eyes. It is only in exceptional cases in which the mobility inwards of the squinting eye is much increased, and the opening of the lids not wider than in the other eye, that he rectifies a very large deviation by a single tenotomy. Under other circumstances, as when the departure of the patient, or some other reason, prevents a second operation, he prefers an unilateral modified tenotomy to the practice followed, in such cases, at Moorfields and elsewhere, of dividing both internal recti at the same time. He more frequently is satisfied with a single tenotomy when the deviation does not exceed 3‴ in adults, or 4‴ in children. He attaches especial importance to the conjunctival suture, for which he uses a fine curved needle and the finest English black silk. Even if several stitches are inserted, no trace of a scar will remain.

Dr. Liebreich considers the third point of advantage, the rendering repeated operations unnecessary, to be the most important. He states that in this modified tenotomy, especially when the section of capsule is extensive, the difference between the immediate and the ultimate result is very great; and that, where the mobility inwards of the eye is at first almost destroyed,

it will, nevertheless, be completely restored in the course of time.

### AMAUROTIC FORM OF DOUBLE QUOTIDIAN INTERMITTENT.

*By Dr. Testelin* (*Bull. Méd. du Nord*, 1866, p. 221; *Annales d'Omlistique*, vol. 56, p. 317).

Dr. Testelin relates the case of Marie K., æt. 10 years, brought to him on the 2nd of July, 1866. Her father stated that she became periodically blind of the left eye, which, beyond a little redness of the palpebral conjunctiva, presented no morbid appearance. Its vision was equal to that of the right, its pupil regular and contractile, and the ophthalmoscope revealed nothing abnormal. The child was very intelligent, and it appeared from her statement and replies that she was attacked twice a day, about 11 a.m. and about 4 p.m., with complete temporary blindness of the left eye. Each attack was ushered in by slight *malaise*, a kind of shiver, and a little headache; then, all at once, the left cheek became warmer, the left eye tingled a little, and vision ceased completely, without any appearance of sparks or bright lines. The patient was very positive on this point, and states that when the right eye was closed she was in absolute darkness. This condition lasted from fifteen minutes to half an hour. The child lived in a house close to a watercourse recently covered, she attended a day school on the bank of the Lower Deûle, and went frequently into a field also on the bank of the Deûle.

The diagnosis of malarious fever was clear, and Dr. Testelin prescribed 30 *grammes** of sulphate of quinine, to be taken daily in a single dose. On July 3rd the attacks were already modified, only the morning paroxysm occurred, and that only lasted four minutes. 4th. The morning attack lasted ten minutes, and the afternoon one fifteen minutes. 5th. No attack. Two grammes of sulphate of quinine and one gramme of tartaric acid, in 40 pills, eight to be taken in one dose daily. 6th. The morning attack consisted only of a slight obscurity; the afternoon attack was a quarter of an hour before its usual time, and lasted a quarter of an hour (8 pills). 7th. No morning attack. At 4 p.m. loss of vision for 20 minutes (8 pills). 8th. No attack (6 pills). 9th. Ten minutes blindness at 10h. 10m. a.m. (10 pills). 10th. No attack (10 pills). From this day the attacks ceased, but the patient took, on the 11th, 10 pills, on the 12th 8 pills, on the 13th 6 pills, the 14th 4 pills, the 15th 2 pills.

The patient then went for a fortnight to a healthy country

* Qy. *centigrammes*.

neighbourhood, and took carbonate of iron in full doses for a month. She has since continued free from the disorder, and in perfect health.

### THE TREATMENT OF FISTULA OF THE CORNEA.

*By Dr. Wecker. El Papellon Médico (of Madrid) ; Annales d'Oculistique,* vol. 56, p. 305.

*El Papellon Médico* publishes a series of letters between Drs. Wecker and Delgado upon interesting points of ophthalmic practice. Dr. Wecker writes about corneal fistula as follows:—

It sometimes occurs that a corneal ulcer perforates that membrane, or that an abcess in its substance opens both internally and externally, leaving a permanent orifice through which the aqueous humour escapes. Generally, prior to the perforation, the membrane of Descemet protrudes through the opening in the corneal tissue, and ultimately the apex of this protrusion bursts, and the membrane tears into little flaps, which may be carried forwards by the outflow of aqueous humour, so as to meet, and become adherent to, the anterior boundary membrane (Bowman's) of the cornea. In this way a permanent fistula may be formed, analogous to a fistula uniting two mucous tracts. Attempts have been made to close such openings by the free use of solid nitrate of silver, but often without success; and, when successful, at the cost of a large and indelible cicatrix. Iridectomy, the strangulation of a portion of iris in the fistula, and a crucial incision of the walls of the opening with a paracentesis needle, have all been recommended; but such operations are very difficult in an eye with no anterior chamber, and softened by the loss of its aqueous humour.

Having frequently seen a corneal fistula established after the rupture of a protrusion of the membrane of Descemet, and convinced that the fistula is due to the eversion of the portions of that membrane, M. Wecker has devised the following method of treatment. He introduces into the opening a very fine straight forceps, with smooth points, and seizes the wall of the fistulous track, so as to bruise or tear the lining of the track, and to denude the proper corneal tissue. During this proceeding, if the fistula be central, the smooth points of the forceps come in contact with the anterior capsule of the crystalline lens, so that great care and gentleness are required. Having nipped or squeezed the wall of the fistula at several points, a strong solution of atropine is applied, and a compressive bandage is worn for from eight to fifteen days, being removed once daily for the repetition of the atropine.

By this method M. Wecker has recently cured a case of corneal fistula that had existed for ten months notwithstanding various treatment. The resulting cicatrix was smaller than it would have been after the use of nitrate of silver.

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